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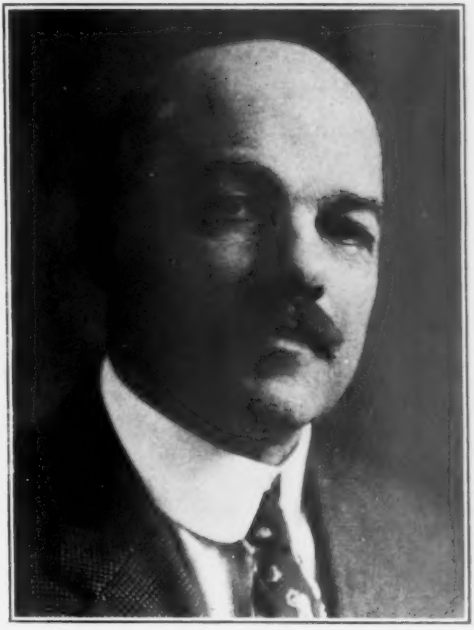

M. R. CAMPBELL
Who discusses the future of coal in this issue

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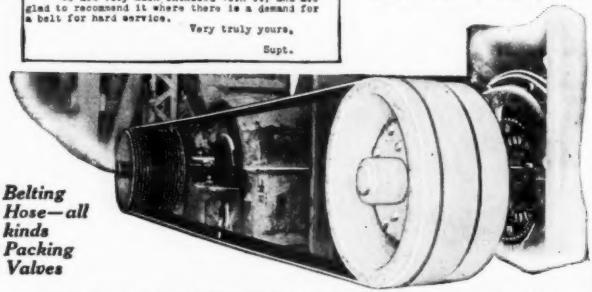

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*Second*—Intelligent conservation with a view to the highest development and use of our mineral resources.

*Third*—The stimulation of investment in practical mining operations by showing that mining is a legitimate business when intelligently conducted.

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VOL. 2, NO. 8 WASHINGTON AUGUST, 1916

THE MINING CONGRESS JOURNAL

*Official Organ of the American Mining Congress*

# COPPER TAX LIKELY TO BE ELIMINATED FROM REVENUE BILL

## Determined Fight Made in Senate on Provision of Bill—Senators Walsh, Smith, Pittman and Others Denounce Tax Passed by House as Discriminatory and Indefensible—Called "Plain Tyranny"

While it is a very generally held opinion around the Capitol on this date (July 27) that the tax on copper will be eliminated from the revenue bill, there is still considerable uncertainty in regard to it. Senators Stone, Thomas and Hughes, who constitute the subcommittee which is in charge of that portion of the revenue bill which refers to copper, will make no forecast as to the recommendation they will make to the full Finance Committee. The revenue bill opens so many intricate angles of discussion that it is hardly possible that it will be reported to the Senate before August 14.

The presentation of the Revenue bill has resulted in the greatest activity seen at the Capitol during this session of Congress. There are many features of the bill which have brought forth the most vigorous protests, but there is none which seems to be as generally regarded as discriminatory as the tax on copper.

It is stated that some members of the Finance Committee favor a general tax on metals rather than singling out one of them. This plan, however, is not popular and it is far more likely that the copper tax will be eliminated.

In the income tax portion of the revenue bill the following provision is made:

A reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business or trade; and in the case of mines, including oil wells or gas wells, a reasonable allowance for depletion of ores and of other natural deposits, not to exceed 5 per centum of the gross value at the mine of the output for the year for which the computation is made; and in the case of timber, a reasonable allowance for stumpage not in excess of the cost of, or capital actually invested in, the timber sold or removed during the year for which the return is made, but with respect to timber purchased prior to March 1, 1913, a reasonable allowance not in excess of the fair cash value of such timber on March 1, 1913: *Provided*, That no deduction shall be allowed for any amount paid out for new buildings, permanent improvements, or betterments, made to increase the value of any property or estate, and no deduction shall be made for any amount of expense of restoring property or making good the exhaustion thereof for which an allowance is or has been made.

The bill as it passed the House makes the following provision for taxing copper:

Every person smelting copper ore or copper concentrates, refining metallic copper, or alloying copper, shall pay for each taxable year an excise tax equivalent to the following percentage of the gross receipts during such year from the sale or disposition of refined copper or copper alloys and from the sale or disposition of crude or unrefined copper if sold or disposed of for any purpose except for refining or alloying:

One per centum of the amount by which such receipts exceed $25,000 and do not exceed $1,000,000;

Two per centum of the amount by which such receipts exceed $1,000,000 and do not exceed $10,000,000; and

Three per centum of the amount by which such receipts exceed $10,000,000.

Limited hearings were allowed by the subcommittees. Senators Walsh, of Montana, Pittman, of Nevada, and Smith, of Arizona, made personal arguments for the adjustment of the tax. Other Senators and a number of other witnesses also were heard.

Senator Walsh in his argument pointed out that 80 per cent of the copper in the United States is produced by the smelting companies themselves. He called attention to the fact that this was true among the greatest four copper producing companies: The Anaconda Copper Co.; The Kennicott Copper Company (Guggenheim); The Phelps-Dodge Company, and the W. A. Clark companies. Senator Walsh characterized the proposed tax as "obviously and grossly unjust" and said that the enactment of the secion of the bill making provision for the tax on copper would be plain tyranny. He contended that copper is no more a munition of war than is cotton, zinc, lead, steel or antimony. He pointed out that every

time copper is used in munitions it is combined with a considerable portion of zinc.

The sub-committee was very much surprised when Senator Walsh produced figures showing that the exports of raw copper are not as great at present as before the war, and that during the greater portion of the time since the beginning of the war copper exports were very much below normal. The central powers took 170,000 tons a year before the war and despite the somewhat heavier purchases by the allied countries they are not equal to the peace demand from Germany and Austria.

Senator Walsh called attention to the fact that many other articles have increased in price in greater proportion since the war began than has copper. He supported this statement with figures obtained from the government and other absolutely authoritative sources. He also embodied in his statement the recent mid-year statement on metal production given out by the Geological Survey. He made a part of his presentation of the case the arguments on which is based the expert conclusion that copper would be selling for twenty to twenty-five cents per pound if there had been no European war.

It is the conclusion among Senators that the Ways and Means Committee of the House accepted the proposal to attack copper at the last moment as there are various indications that it was thrown into the bill at the last moment.

Senator Walsh went into details and discussed the method of mining and treating copper.

Senator Thomas propounded a number of very illuminating questions.

### SENATOR SMITH'S STATEMENT

Senator Marcus A. Smith, of Arizona, made the following statement to the sub-committee:

The very illuminating argument of the Senator from Montana leaves little for me or any one to say in favor of striking this whole copper schedule from this bill. How it ever got into the bill is beyond my comprehension, unless the author of the strange proposition felt that inasmuch as the copper miners and refiners were enjoying for once great prosperity, and therefore should contribute large sums through taxation to the general welfare, and particularly because the very limited area in which that metal is produced, furnished so small a number of Senators and Congressmen that no difficulty would be encountered in imposing the exaction. Be that as it may; the tax attempted in this schedule is monstrous and utterly indefensible. It outrages every sense of justice and every principle of equity in any mind acquainted with the facts about the case. There is no more reason to tax copper as munitions of war than there is to tax zinc, lead, steel, pig iron or cotton, which is to some extent used in explosives, and declared conditional contraband of war. Nay, there is less reason to tax copper than there is to tax pig iron as war munitions.

Senator Thomas. Do you not think as a fundamental objection we might concede the falacy of every other one urged, still that would remain an insurperable objection to the imposition of a tax on copper?

Senator Smith, of Arizona. Unquestionably. That consideration alone should defeat this proposed tax. It resolves itself at last to a question of fairness and legislative decency. The people producing copper justly feel that it is a bare faced imposition on them and because, perhaps, they could not—as I have stated—by reason of their limited representation in Congress, successfully defend themselves. On this phase let me say that we will make up in zeal and earnestness what we lack in numbers, in resistance of this tax. It is violative of that provision of the Constitution requiring uniformity in taxation. If war munitions are to be taxed and the spirit of uniformity preserved, why are iron and lead and zinc absent from this schedule?

Senator Thomas. Suppose we should enact the law as it came over from the House, with that discrimination so apparent, do you think it would be enforced in the courts?

Senator Smith, of Arizona. Considering certain recent decisions of the courts I am not willing that this matter should ever get that far.

Senator Thomas. Well, as an abstract proposition of law?

Senator Smith, of Arizona. As an abstract proposition I have no doubt of the illegality of this tax on copper. Out of abundant caution I am led to fear that the court might hold that Congress had power to impose the tax on this product and omit the other articles, by holding that the tax was imposed on all within a certain class and was as to that class uniform in its operation and therefore not obnoxious to that provision of the Constitution requiring uniformity.

Senator Thomas. On the face of this law it is an obvious fact that occurs to every man—and your attention is directed to the face of the bill—that there are certain metals singled out with no reason that rests itself in the mind at once for the purpose of levying upon them an enormous tax and every reason to be assigned for it is equally applicable to a dozen other elements all around it. Now the fundamental principle of taxation, as Senator Walsh has stated to the committee, is uniformity, and for the very reason that they are empowered to levy a tax on commerce, I believe the courts in their capacity would, by means of the power of Congress, use it. It would be in a way like levying a tax upon you and exempting every other man in this room.

Senator Smith, of Arizona. I am sure most lawyers will feel that such obvious discrimination against one metal used to a relatively small extent in the manufacture of war munitions, violates the law of uniformity. The only case directly in point that I can recall, arose in the cotton tax case just after the war. In the lower court an injunction was sought restraining the

(Continued on page 374)

# MUCH OF COUNTRY'S HIGH GRADE COAL MAY BE EXHAUSTED WITHIN 50 YEARS

## M. R. Campbell, of United States Geological Survey, One of Nation's Most Competent Authorities on Coal, Makes Striking Observations with Regard to Future of Coal Production—Coal Reserves Estimated

Some striking facts with regard to coal are brought out in the following statement by M. R. Campbell, of the U. S. Geological Survey:

"In undertaking to make an estimate of the original tonnage of coal in the ground, certain assumptions must be made as a foundation; and the results attained will depend largely upon these assumptions. The three principal assumptions are: (1) minimum thickness of bed of the different ranks and grades of coal that can be mined; (2) maximum depth to which mining may be carried in the different ranks of coal; and (3) maximum percentage of ash that may be permitted in the various ranks of coal. As probably no two persons who have attempted to make estimates have made the same basic assumptions, so no two estimates agree as to the tonnage involved. This point is very important; and is one that is usually lost sight of by the casual reader, who doubtless wonders why it is that experts disagree so widely in their estimates; whereas, if he had analyzed the results a little more closely, he might have found that the results were practically in accord.

### ENGINEERING PRACTICE

"Most engineers employed by private corporations base their estimates on the present practice of mining and preparation for the market, for these are the conditions that the mining company must face; and it is manifest that it will not consider coal as minable at a depth of 4,000 feet, while plenty of the same kind of coal is available at a depth not exceeding 1,000 feet. Similarly, it will not consider as minable a coal bed 20 inches thick, while there are other beds of the same kind of coal of much greater thickness still available. Also to the operator of the present time 15 per cent of ash in a coal may prevent its sale, and therefore its mining may be impracticable; whereas, if a washery were installed and plenty of water were available, 15 per cent of ash might be no bar to the mining and marketing of the coal. Most of the estimates so far made have been based on present mining conditions and practices, and hence they do not necessarily represent the tonnage that may be regarded as available ten or even five years hence.

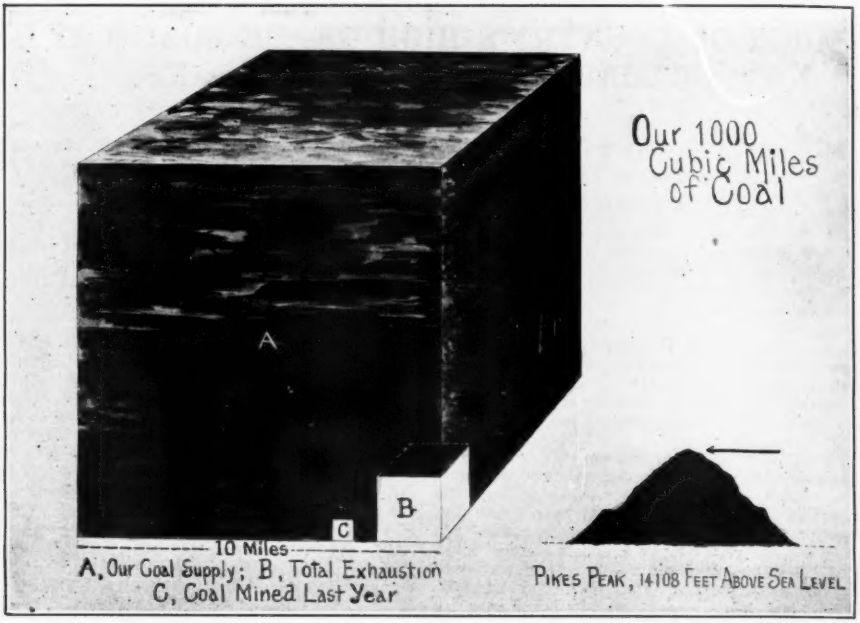
### LOOK TO FUTURE

"In attempting to make estimates of the original coal tonnage of the fields of the United States, the Geological Survey decided that it would be not only a waste of time and money to attempt to make estimates based on present mining practice, for such an estimate would be misleading in that it would not represent the total quantity of coal that undoubtedly would be made available in the future. With this point in mind, it was decided to attempt to estimate the total quantity of coal that ever would be mined in the United States, looking ahead forty, fifty or perhaps even 100 years. Of course, it is not contended that any one living can say positively what will be done 100 years hence, but an attempt was made to make such a forecast into the future. In doing so, the present mining practice throughout the world was considered; and the assumptions regarding maximum depth, minimum thickness, and maximum impurity were based upon present practice, but generally exceeded because it is almost certain that future operations will go far beyond the present practice, even where today the methods are far better than those generally prevailing twenty or even ten years ago.

"As the deepest coal mines in the world (in Belgium) go to a depth of approximately 4,000 feet, and as shafts for copper and other metals have been sunk to a depth of over 5,000 feet, it was thought that coal mining in the future might be carried to a depth of 6,000 feet; but in order to meet various requirements two limits were set, one at a depth of 3,000 feet for easily minable coal, and the other at a depth of 6,000 feet, which represent what is now considered as the ultimate limit of coal-mining operations. Similarly the minimum thickness of coal bed mined in the United States is about 15 inches, therefore 14 inches was taken as the minimum of high rank coals for estimating the original tonnage in the various fields. The minimum thickness varies according to the rank of the coal, being approximately 2 feet in subbituminous coal and 3 feet in lignite. The maximum percentage of ash permissible in a coal is more difficult to determine, on account of the variability of the factors involved in the question of cleaning such coal for the market. Thirty per cent has been regarded as the limit, with a question as to whether or not it had better be placed at 25 per cent.

### SOME DATA INACCURATE

"With the basic factors of the process determined, the actual application of the principle of estimation is an engineering problem, which depends upon the data collected by the geologist and his mapping of the coal fields. In many of




the fields these data are fairly sufficient, and a reasonably accurate estimate has been made; but in other fields the data are confessedly inadequate, and the estimate is correspondingly unsatisfactory.

### DISTRIBUTION OF COAL

"A statistic shows clearly certain features regarding the distribution and amount of coal in the fields of the United States that are of the greatest interest. It shows first that the great bulk of the coal in this country is of low rank bituminous, lignite, and sub-bituminous, named in the order of their abundance; and that the high-rank coals are relatively scarce. This is an important point in conservation; as it means that our best coal will be the first to be exhausted, and that such exhaustion may occur in the not very distant future. It is also noticeable that the best steaming coal, the semi-bituminous, is practically limited to the two eastern provinces, and that the exhaustion of this coal will be a greater calamity to the country than the loss of all the anthracite, for this kind of coal has a greater efficiency and is adapted to more diverse uses than is anthracite. Most people think of the eastern part of the United States as the greatest repository of coal in the country, and therefore they may be surprised to find that there are two areas in the West that contain a greater quantity. The greatest quantity of coal that is contained in any single area of continuous coal-bearing rocks is 1,202,032,000,000 tons in the Fort Union region of Montana, Wyoming, and the Dakotas; the second is 665,660,600,000 tons in the Green River region of Wyoming; and the third is 550,898,800,000 tons in the Appalachian region of the East.

### ORIGIN OF PRODUCTION

"When the production of the mines is compared with the original tonnage it is seen that the great bulk of our coal is not necessarily coming from the areas which contain the greatest quantity, but from the areas which contain the best coal. This discrepancy is more startling when the production of the individual States is compared with their original tonnages.

"Although the relative size of the contents of the coal fields may be a matter of some surprise, the really staggering fact is the immense, really inconceivable total tonnage of the coal fields. If all of the unmined coal within 3,000 feet of the surface, or 3,538,554,000,000 short tons, could be placed in one great cubical pile as solid as it now lies in the ground, it would make a pile 18 miles long, 18 miles wide, and 18 miles high. Similarly, if all of the coal that has been mined in the United States, plus about 50 per cent for waste, or 15,083,100,000 short tons, were similarly piled, it would make a cube 1,540 feet long, 1,540 feet wide, and 1,540 feet high, or in other words about 4 per cent of the original amount has been mined or wasted in mining.

"There has been considerable speculation regarding the length of time the coal supplies would last, but here again there are so many unknown factors that any estimate partakes of

the nature of a guess. In attempting, therefore, to calculate how long the available coal will last it is manifestly incorrect to base it on the present rate, or rather the rate for the last decade, for the rate in the future will continue to increase for at least a long time to come. If we assume that the rate of consumption will remain the same as it was in 1913, then after allowance has been made for unpreventable waste in mining and marketing there will be enough coal to last 4,000 years; but, of course, such an estimate is absurd, for the rate of 1913 will not be held in the future probably for a single year.

### MAY LAST ONLY 100 YEARS

"If consumption be prolonged at its rapidly increasing rate, and this acceleration continues until the complete exhaustion of the coal, the supply would probably not last 100 years. The true life of our coal fields probably lies between these two extremes, with the probability that it will be nearer 100 years than 4,000 years.

"In 1908 E. W. Parker attempted to extend the curve of production to what he conceived might be the possible maximum that would ever be reached in this country. The past and the estimated future production was grouped by decades beginning with 1835 and extending to the year 2055, when, according to his calculations, the maximum production of 23,000,000,000 short tons would be reached. As the quantity of coal mined in the decade ending with 1914 was 4,779,820,431 short tons, the maximum according to Parker's figures would be roughly five times the present production. After the maximum had been reached the production, owing to increased cost of mine haulage, of hoisting from deeper shafts, and of working thinner beds, would gradually decrease, but in all probability the decrease would be much less rapid than the increase up to the maximum. According to the present estimates there is enough coal in the ground for production to continue at this assumed maximum rate for more than ten decades or 100 years.

### EXCEEDING ESTIMATE ALREADY

"The production figures available since 1908 show that Parker's curve is too flat, for his estimate of the production in the decade ending in 1915 of 4,528,000,000 tons is already exceeded in the production of the decade ending with 1914, which is 4,779,820,431 tons. Thus it seems probable that his estimated maximum production is too small, or that the maximum will be reached before the year 2055. The former is the more probable hypothesis and therefore the maximum production will probably be greater than 23,000,000,000 tons in a decade.

"Although the ultimate exhaustion of the coal reserves of the United States appears, by every legitimate hypothesis to be so far in the future that it need concern this generation but slightly, it must be remembered that the bulk of the coal being mined today is the best in the country and that before long, perhaps within fifty years much of the high-rank coal will be exhausted. Although there will still remain a vast quantity of poorer fuel, it behooves this generation to guard carefully its stores of high-rank coal.

"According to the latest estimates the coal reserves of the world by continents, expressed in short tons are as follows:

| | |
|---|---|
| Americas | 5,627,823,500,000 |
| Asia | 1,410,487,600,000 |
| Europe | 864,412,600,000 |
| Oceania | 187,842,900,000 |
| Africa | 63,755,900,000 |
| | 8,154,322,500,000 |

"Of the amount contained in the Americas, the United States claims 4,205,154,000,000 tons, or 51 per cent of the total coal in the world. Listed according to coal reserves, expressed in short tons, the principal coal-producing countries of the world stand as follows:

| | |
|---|---|
| United States including Alaska | 4,231,352,000,000 |
| Canada | 1,360,535,000,000 |
| China | 1,097,436,000,000 |
| Germany | 466,665,000,000 |
| Great Britain and Ireland | 208,922,000,000 |
| Siberia | 191,667,000,000 |
| Australia | 182,510,000,000 |
| India | 37,083,000,000 |
| Russia in Europe | 66,255,000,000 |
| Union of South Africa | 61,949,000,000 |
| Austria | 59,387,000,000 |
| Colombia | 29,762,000,000 |
| Indo-China | 22,048,000,000 |
| France | 19,382,000,000 |
| Other countries | 69,369,500,000 |
| | 8,154,322,500,000 |

## Safety Lamps Approved

The Bureau of Mines has approved for safety and for practicability and efficiency in general service two additional portable electric mine lamps:

The "Wico" lamp (Approval No. 14) by the Witherbee Igniter Co., of Springfield, Mass. The only bulbs that have been approved for use with this lamp are the Symbol BM-14 bulbs made by the Edison Lamp Works of the General Electric Co., at Harrison, N. J.

The Concordia lamp (Approval No. 15), made by the Concordia Safety Lamp Co., of Pittsburgh, Pa. The only bulbs that have been approved for use with this lamp are the Symbol BM-15 bulbs made by the National Lamps Works of the General Electric Co., at Cleveland, Ohio.

Each of these lamps will be identified by a brass approval plate approximately 3 inches by 2¼ inches in size which is riveted to the battery casing. Upon this plate are engraved the seal of the Bureau of Mines and the statement and number of the approval. Lamps that do not bear an approval plate are not to be considered as approved lamps. This statement also applies to explosion proof coal-cutting equipments. All employes of the Bureau have been urged to emphasize the indispensability of the approval plate, which is the Bureau's formal certificate of approval.

## DIVIDES IRON-DEPOSITING BACTERIA IN THREE GROUPS

"The enormous importance of bacteria in all that pertains to the nutrition and well-being of animals and of the higher plants is today a matter of wide recognition, even by those whose knowledge of the part played by these minute and wonderful organisms is far from exact. The investigations of Pasteur opened our eyes to their deadly power in disease and their enormous efficiency in processes of fermentation and decay. Realization of the influence of bacteria in affecting the character and fertility of soils, in bringing about rock decay and in producing other geological results has come more slowly." These are observations of F. L Ransome, of the Geological Survey. In addition Mr. Ransome says:

"It has been known since 1836 that certain bacteria have the power of withdrawing iron from solution and causing its precipitation as ferric hydroxide or ferric sulphide, as the case may be. The geological applications of this discovery, while foreseen by some to be far-reaching, have been rather slowly made and it is safe to say that many geologists have paid little attention to the possible extent of bacterial action in the deposition of iron ores. Lately, in connection with the studies in coastal plain geology now in progress, under the direction of T. W. Vaughan, the part played by bacteria in the deposition of limestones has been specially investigated and found to be important. Similarly when Mr. Harder, who has devoted particular attention for some years to the occurrence of iron ores, was detailed to study the Cuyuna Range, Minnesota, he found an opportunity in the laboratories of the University of Wisconsin to pursue investigations on the iron-depositing bacteria.

"Opinions have differed as to the mode whereby the bacteria withdraw iron from solution. Some investigators have maintained that the deposition of iron hydroxide is one of the vital processes of the organism and as such is affected directly by the action of the living cell; others, that the precipitation is purely chemical and is incidental to rather than essential to bacterial life; and still others, that the accumulation is mechanical, particles of iron hydroxide present in the water being caught and held by mucilaginous parts of the bacteria.

"Mr. Harder has found that in addition to the iron-depositing bacteria proper, chiefly the higher or thread bacteria, probably many of the common soil and water bacteria are active in the precipitation of ferric hydroxide or basic ferric salts from solutions containing iron salts of organic acids. This result is believed to be new. Such bacteria apparently utilize some constituent of the salt other than iron, the iron hydroxide being left as a waste product.

"Mr. Harder believes that, according to present knowledge, there are three principal groups of iron-depositing bacteria; (1) those which precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide set free and the available energy of the reaction for their life processes; (2) those which do not require ferrous bicarbonate for their vital processes but which cause the deposition of ferric hydroxide when either inorganic or organic salts are present; and (3) those which attack iron salts of organic acids, using the organic acid radical as food and leaving ferric hydroxide, or basic ferric salts that gradually change to ferric hydroxide."

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## BENEFIT OF FIRST-AID TRAINING SHOWN QUICKLY

The profit of first-aid knowledge was shown strikingly in an incident described by G. T. Powell, one of the Bureau of Mines' foreman miners. Mr. Powell tells of the incident as follows:

"While training the miners from the Crescent mine at Evansville, Ind., there were a large number of spectators, two of whom were workmen at a foundry close by. A few days later one of the workmen at the foundry received a compound fracture at about the middle of his right forearm, while at work, and had received quite a large laceration. The men started to cover the wound with dirty material as they usually did, but one of the fellows who was looking on, stopped them and applied a tourniquet made from his handkerchief and splinted the forearm as he saw us do while training. The man was taken to the hospital, and when the doctor saw the dressing, he made the following remark: 'Well, I see you have some first-aid man at your place, and he certainly has put on a dandy dressing.' The foreman said they had not put anything on the wound, as the man who put the boards on would not let him. The doctor said that whoever put the splints on knew his job, especially in not putting any dirty cloth on the wound, and that he had done the proper thing not to put on any dirty material when he did not have sterile material. Receiving this compliment on the first dressing that he applied, the foundryman is considered quite a hero, especially since all the training he had was in watching the miners' practice. The men at the foundry have been after me ever since to give them the same training that I give the miners."

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## HUNT FOR OIL AND GAS IN TETON COUNTY, MONTANA

The Geological Survey is making an examination of the extension into Teton County, Mont., of a belt of cretaceous and tertiary rocks which are known to contain oil and gas north of the Canadian boundary.

The examination is to be made with the object of ascertaining the possibility of the occurrence of oil and gas in these same rocks south of the border. Eugene Stebinger is the geologist in immediate charge of the investigation.

# TUCSON, ARIZONA, AND FAIRBANKS, ALASKA, GET MINING EXPERIMENT STATIONS

## Director Manning, of Bureau of Mines, Hurries West to Investigate Best Site for Third Station—Karl Kithil to Have Charge at Tucson, and J. A. Davis at Fairbanks

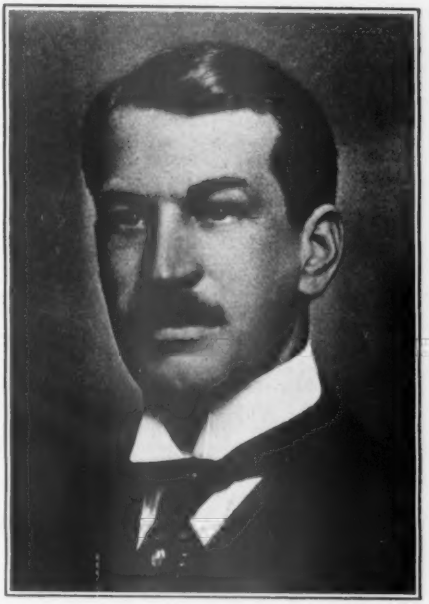
Secretary of the Interior Lane on July 22 announced the location of two of the three mining experiment stations and the three mine-safety stations provided for in the act passed last year by Congress and appropriated for at the present session. The first of the experiment stations is to be at Fairbanks, Alaska; the second at Tucson, Ariz.; and the third, not yet definitely announced, in the Pacific Northwest. The exact location of the last-named station is being held in abeyance pending personal investigation of the needs of that section soon to be made by Director Van H. Manning of the Bureau of Mines at the request of Secretary Lane. The safety stations as decided upon will be at Butte, Mont.; Reno, Nev.; and Raton, N. Mex. The sum of $25,000 is appropriated for each of the mining experiment stations and $101,500 for the three safety stations.

Karl Kithil will have charge of the Tucson station and J. A. Davis of the Fairbanks station.

The act authorizes the Secretary of the Interior to establish in the several important mining regions of the United States ten mining experiment stations and seven mine-safety stations in addition to those already established, but provides that not more than three of the experiment stations and the same number of safety stations shall be established in one year. The purpose of all the stations according to the law is to make investigations with a view toward improving conditions in the mining, quarrying, metallurgical and other mineral industries, safeguarding life among employes, preventing unnecessary waste of resources, and otherwise contributing to the advancement of these industries.

Each of the mine-safety stations is to be equipped with an all-steel mine rescue car which will respond to disaster calls within its prescribed territory. Congress has appropriated $53,000 for the purchase of the three cars and the contracts are about to be let by the Bureau of Mines. These cars will be of special design and will represent the most modern thought in rescue work. They will be manned by expert crews of life savers, who, when they are not employed at a mine disaster, will go to the different mining camps and train the miners in rescue work and first aid to the injured.

"The establishment of the metallurgical experiment stations and the safety stations is one of the most important constructive steps that has been taken by Congress in the upbuilding of our mineral industry," said Secretary Lane in commenting upon the announcement of the location of the stations. "It is a most deserved recognition of an industry which now has a yearly output of probably two and a half billion dollars and which is next to agriculture in its importance to the welfare of the country.



KARL KITHIL

Director of Experiment Station to be Established at Tucson, Ariz.

"The experiment stations come to the great West at a time when they are peculiarly needed. The great impetus which has been given the industry through the European war and the coincident development of the so-called oil flotation process in the utilization of the lower grade ores have emphasized the necessity for such research aid as only the Federal Government can give. With the development of metallurgical processes, many of which are now under way, I expect in the near future to see a much greater industry, enjoying greater prosperity and employing more men, with the utiliza-

tion of the low grade mineral deposits to their highest extent. Already there are signs that this is coming. Old mines are being reclaimed, abandoned dumps which contained supposed worthless material are being worked over, and many prospects that heretofore were not considered workable are being turned into substantial mines.

"And with the three mine-safety stations, we are not forgetting the men who toil beneath the ground. Their safety is an important part of the work of the Bureau of Mines.

"There has been a great deal of earnest rivalry between different localities for these first experiment and safety stations and it has been difficult to make the selections. I can only say that the matter has been given most careful thought in all its bearings and that we have done what we thought was for the best. In the future some of the other localities will be given their opportunity."

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## SAFETY-FIRST SLOGAN FOUND WONDERFULLY SUCCESSFUL

A special investigator of the Department of Labor of the New York Industrial Commission has been at work in some of the big plants where large numbers of men are employed and he reports that the "safety first" slogan has been wonderfully successful in reducing the number of deaths and accidents at these places, says an editorial in an eastern paper. To many persons these magic words are meaningless or are accepted as a good-natured jest, but this official finds that injuries at the plants under consideration show a reduction ranging from 34 to 92 per cent of the rates prevalent before the inauguration of the movement. Fatal accidents at the works of the Lackawanna Steel Company in 1915 were 90 per cent below those in 1914. The United States Steel Company and the International Harvester Company report results which are almost as gratifying.

The chief value of this movement lies in the fact that it has taught men to stop and think. Heretofore many men and women employed in large industrial establishments have gone along with a delightful sense of irresponsibility. But now they are being gradually taught to take care of themselves, and the results are shown in the figures presented by the New York investigator. The general public has had no conception of the appallingly large number of accidents in industrial establishments. It has been supposed in a hazy sort of way that it is dangerous work in coal mines and on railroads, but there has been no adequate conception of the lives that have been lost and the number of persons that have been maimed in other lines of human endeavor. But the campaign of education that has followed the cry of "safety first" has had wonderfully effective results. It proves the difference between systematic effort and luck and chance.

The average employer is a pretty decent sort of person. It is a mistake to suppose that he is indifferent to these unfortunte accidents. Aside from the humane feature of the business it is against his interests to have his employes killed or maimed, and as a consequence the heads of these concerns have welcomed the movement for cooperation in guarding against avoidable accidents. In many of these concerns prizes are offered to the men who make the best suggestions for preventing accidents and the responses have been most gratifying. It has had the effect of improving the relations between employes and employers by demonstrating that their interests are identical. It has engendered a feeling of mutual regard which has helped one as much as the other. Altogether it has been a move in the right direction.

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## SAFETY-FIRST TOUR TO END SOON—IDEA PROVES POPULAR

One of the most popular things which has been done by the Bureau of Mines is the Safety-First Train. This train carries exhibits showing the activities of the Government in the saving of life and property.

While the exhibits are contributed by twenty-five government bureaus, the idea originated in the Bureau of Mines, and it is that Bureau which is engaged in work looking to the conservation of life and property on a larger scale than any other division of the government departments.

The safety-first train, which consists of twelve extra-length steel cars, was furnished by the B. & O. Railroad. It was through the cooperation of that railroad that it was possible for several hundred thousands of persons to see the exhibits. The Government has made no appropriation to cover the expense and equipment of the train, or the cost of its transportation.

Director Manning has been embarrassed by the large number of requests which have been made for the train, as he cannot direct its itinerary. Practically every congressional district in the United States is anxious that the safety-first train visit it. Congressmen and Senators have been very active in their efforts to secure a trip through their portions of the country.

Since the train can only go over such lines as may make arrangement with the company owning the equipment, it will be impossible to cover the entire country as desired. The success of the train, however, lead to further effort along this line, which will enable more people to view the safety-first exhibits, although it is expected that the tour will end soon as the railroad company has given notice that it cannot afford to do without the equipment any longer.

## GOVERNMENT EXPERTS WELL KNOWN TO MINING MEN

*Photo. by Harris & Ewing*

ADOLPH KNOPF
Geologist

Adolph Knopf was born in San Francisco, 1882. His early education was obtained in the public schools of that city. Following the completion of his high school course he attended the University of California, and was graduated from that institution in 1904 with a degree of B.S. He took a post-graduate course and earned a degree of Ph.D. which was given him in 1909.

In 1905 Mr. Knopf began temporary work with the U. S. Geological Survey. The summer of that year was spent in Alaska. The following year he was put upon the permanent roll and did Alaskan work exclusively.

While in Alaska his principal studies were confined to tin, gold and copper deposits. He is the author of a report on the tin deposits of Alaska, as well as many articles on gold and copper.

During 1912 and the years since then, Mr. Knopf has been working upon metalliferous deposits in Montana, Nevada and California. He is author of a report on the platinum deposits in the Boss Mine, Good Springs, Nev. He has a report on the Yerington district of Nevada in preparation.

## ALASKA-JUNEAU SUPERINTENDENT PRAISES FIRST-AID TRAINING

The amount of good that is being done by the Bureau of Mines in training miners in first aid and rescue work cannot be fully known. The trained men, as a rule, go about their daily tasks in the usual way, and whenever occasion arises where they have to give succor they respond willingly and lives are saved. It is almost an ordinary event in the life of a first-aid man and he does not think it is necessary to make any report which will reach the public. Only occasionally does direct testimony come of the lives that are being saved through knowledge gained in first-aid and mine-rescue training.

At Juneau, Alaska, recently, the mining camp of the Alaska-Juneau Gold Mining Co. was startled by the disappearance of a four-year-old boy, Francis La Rochelle. J. H. Richards, superintendent of the mine, gathered a party together and searched the country. The boy was found unconscious, was given first-aid treatment, and is on the way to recovery.

In writing of the case to S. S. Smith, federal mine inspector for Alaska, Mr. Richards said:

"I believe that first aid was entirely and directly responsible for the saving of Francis La Rochelle's life. Immediately after the boy was found in an unconscious and nearly frozen condition, his clothes were cut off and replaced with dry, warm ones, taken from the backs of those in the searching party. An effort was at once made to start the circulation, by rubbing and chafing the boy's limbs and body. As soon as possible he was taken to the hospital, but the rubbing treatment was continued while en route there on the train. The prompt treatment to restore the boy's circulation and the application of warm clothes really saved the boy's life, for his vitality was extremely low when we found him.

"I believe Frank White was the only one in the party who has had the benefit of the instruction given in first-aid work by yourself and previous to your coming to Juneau, by Guy Johnson, of Treadwell, but the other men in the party lent a ready hand. We appreciate very much what you and Mr. Johnson have done in the way of teaching the men this work. I feel sure that it will be very beneficial to us in connection with our work, as accidents occasionally occur, and by having our men trained, they will be ready to help any unfortunate sufferer."

## DEMAND FOR SULPHUR CONTINUES DESPITE HIGH PRICE

The demand for sulphur continues to increase. Prices are steady at record figures as compared with $22.50 per ton, which is the normal price of sulphur.

The extraordinary demand for this mineral is due to the increasing call for sulphuric acid. While a considerable portion of this acid is being used for the manufacture of explosives, the demand is increasing from the manufacturers of paper and from other commercial sources.

## USE OF OIL SHALES IN NEAR FUTURE IS FORESEEN

Against the time when the people of the United States will find it advantageous to begin to utilize the richer part of oil shales for the distillation of their hydrocarbons, the U. S. Geological Survey has resumed its investigations of the deposits of the shales in northeastern Utah.

Circumstances during the past year lead more than ever to the conclusion that oil shales may be used economically in the very near future. The areas containing shales are being mapped. The thickness of the richer beds is being measured at many points. Tests are made in the field by dry distillation to determine roughly, the amount of oil contained in the different beds.

It is proposed to extend these tests to other of the more richly carboniferous beds which have been observed or reported to the Survey.

An advance statement giving the more important results of the previous investigations of these shales has been published quite widely during the past few weeks.

A great deal more data are now available following the detailed results of the distillations made by different processes. Interesting facts have developed as to the gasoline, ammonia, tar and other products.

### Working in Big Horn Basin

Investigation of the oil and gas structure in the northern part of the Big Horn Basin, Wyoming, is being conducted by C. J. Hares and a party of geologists.

### "Who Am I?"

"I am more powerful than the combined armies of the world.

"I have destroyed more men than all the wars of the world.

"I am more deadly than bullets, and I have wrecked more homes than the mightiest of seige guns.

"I spare no one and I find victims among the rich and the poor alike, the young and the old, the strong and the weak, widows and orphans know me.

"I loom up in such proportions that I cast my shadow over every field of labor, from the turning of a grindstone to the moving of a railroad train.

"I massacre thousands upon thousands of wage-earners in a year.

"I am relentless. I am everywhere; in the home, on the streets, in the factory, at railroad crossings, in the mine, and on the sea.

"I bring sickness, degradation and death, yet few seek to avoid me.

"I destroy, crush or maim, yet I give nothing.

"I AM CARELESSNESS."

## GEOLOGIST SAVES HISTORIC PILLAR FROM DISINTEGRATION

That the Geological Survey is of aid to others besides the miners of the country is shown by the following letter from Director Smith to the Secretary of the Treasury:

Edson S. Bastin, whom I assigned to make an examination of the pillar in the south portico of the Treasury Building, which is undergoing distintegration, has made an examination and reports as follows:

The damage consists in the disintegration of the granite at several points. The immediate cause of the disintegration appears to be free sulphuric acid. The disintegration is confined to the immediate vicinity of cement layers between different blocks of granite and is not caused by any defect in the granite itself. The primary cause of the trouble appears to have been the application of acid in cleaning the granite. This acid has worked into the cement between the granite blocks at a few places where this cement was somewhat fractured. The cement proves to be a gypsum cement containing a considerable amount of iron, and the free acid used in cleaning the stone, has attacked this cement, developing iron sulphate and alum; the iron sulphate on contact with the air yields free sulphuric acid. The process therefore is a more or less continuous one. The small amount of the acid which worked in during the cleaning process sufficed to start the process of acid generation from the cement.

As a remedy for the difficulty, I suggest that the decayed portions of the granite be scraped away, that the disintegrated portions of the cement also be scraped out so far as possible, and that the affected parts be then thoroughly washed with a solution of chemically pure sodium bicarbonate, which will neutralize any free acid. This should be applied several times at an interval, say, of a day or two. After that I suggest that the outer inch or so of the gypsum cement be chipped out and that in its place a good grade of Portland cement be applied, which will not be attacked by any future applications of the acid for cleaning, and which will protect the remaining portions of the gypsum cement.

### Help at Cleveland

A mine rescue car with full crew was rushed to Cleveland following the recent explosion of gas in the water works tunnel under Lake Erie. H. M. Wolflin, the engineer in charge of the mine rescue work for the Bureau of Mines, was in charge of the car which was hurried from Barnesboro, Pa., in record time. While the first interest of the Bureau of Mines in sending the rescue car was to save the lives of the men, there is much scientific data obtainable at explosions of this kind.

# STANDARDIZATION OF ORE SAMPLING METHODS URGED BY T. R. WOODBRIDGE

## Despite Importance of This Process, a Large Part of the Sampling Is Not Done on Scientific Basis, He Shows—Bureau of Mines Investigating with Idea of Improving Present-Day Methods

Great need for standardization in ore sampling exists in the West according to T. R. Woodbridge. Mr. Woodbridge spent several days in Washington recently and discussed ore sampling conditions in the West as follows:

"The success of every mining enterprise depends on accurate knowledge of the constituents of the ore taken from the mine. This knowledge may be least necessary for a placer mine or for a company producing bullion from its own ores, but it is absolutely necessary to a company selling its ore, or to a smelter, custom mill, or sampling plant buying the ore.

"In spite of the importance of sampling, a large part of the ore sampling of today is not done on a scientific basis. There are many operators seeking thoroughly satisfactory methods of sampling who, nevertheless, are not doing as accurate work as the present state of the industry permits. On the other hand, investigation shows that in the majority of sampling plants there is a great lack of uniformity, and that even in individual plants several methods or combinations of methods may be found.

"Discussions concerning the theory and practice of ore sampling have appeared at various times in the transactions of the engineering societies and the technical press, but have not resulted in any general uniformity of practice. Especially is this true in regard to discarding methods known to be unreliable. Doubtless some operators are satisfied with this state of affairs and are not concerned with the accuracy of the sampling of individual lots of ore, provided the total purchase price of all lots equals the total value recovered during a certain period of time. Also, a few operators have worked out the problem of sampling for their local conditions to their own satisfaction and profit, and therefore do not welcome any criticism that may result in a change of methods. Most sellers and buyers of ore, however, are frankly disgusted with the persistent use of incorrect methods and would welcome a thorough investigation and discussion of the subject.

"In connection with its efforts to increase efficiency in the mineral industries, the Bureau of Mines has undertaken to investigate present methods of sampling and analyzing ores in this country and to present the facts to all who may be interested in their study and discussion.

"There should be discussion that will ultimately result in the standardization of sampling methods. Sampling would thus be raised from the position of an art to that of an exact science, where it properly belongs.

"The first step forward would be the discarding of methods known to be inaccurate and of methods that, under certain conditions, may be manipulated to give inaccurate results to the advantage of either the seller or the buyer. This would eliminate one of the chief causes of the friction that often develops between the seller and the buyer. At any rate, each party to the transaction should be familiar with the limitations of the method that has been employed by mutual consent, so that neither party will feel that the other is obtaining an unfair advantage."

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### FAILURE TO MAKE RETURNS DELAYS IMPORTANT STATISTICS

Six months ago the Geological Survey sent out requests to 3,600 operators of placer mines, asking for certain information with regard to their properties. Despite various supplementary requests, only 25 per cent have replied. As a result valuable statistics which would be of service to the entire industry are being delayed.

This is in marked contrast with the returns from many of the metal mining operators. In most cases returns are received from more than 95 per cent of all those of whom the original request is made. In some cases 100 per cent of returns are made.

It is the belief of the geologist in charge of this portion of the work that many of the men engaged in placer mining are operating on so small a scale that they believe the Government does not care to hear from them. Just the contrary is the case. Placer mining as a rule is conducted on a small scale and it is only by getting returns from the individual operator, regardless of the size of his property, that reliable figures can be compiled.

The Survey is spending a great deal of money sending geologists to visit the placer mining sections, and considerable disappointment is voiced at the failure to receive more hearty cooperation. The information requested of placer mine operators is as follows:

State, County and District in which mine is located; name of mine; owner; operator; accessibility; when was placer discovered; period of greatest activity; total production to date; fineness of gold; character of deposits; description of cross sections; color of gold; other valuable minerals; average value of whole deposit per yard; value of pay streak per yard; how is deposit worked; amount of gravel handled; length of season; amount of water used; length of ditch or pipe line; operating costs; nearness of neighboring lode mines. The card containing these questions somewhat more in detail may be obtained on application to the U. S. Geological Survey.

## MINERS OVERCOME DISLIKE FOR PERMISSIBLE EXPLOSIVES

Daniel Harrington, district mining engineer of the Bureau of Mines at Denver, Colo., has submitted the following report on the use of permissible explosives at the Hanna mine:

"In May, 1915, Mr. Brennan, of the Union Pacific Coal Co., notified the United Mine Workers of America, through its officials at Cheyenne, that on and after June 1, 1915, only permissible explosives would be used in the Hanna mines of that company. The Hanna mines are gaseous and have had some serious explosions, and Mr. Brennan states that the dust from the Hanna mines is more inflammable, although the coal contains a greater percentage of moisture, than any other coal they mine.

"The miners strenuously objected to the introduction of permissible explosives and it is reported a strike was prevented only by the company promising employment in some of its other mines to any man who did not care to remain at Hanna after permissible explosives were adopted. After the use of permissible explosives was begun at Hanna, complaints were frequent, terminating in a threat to strike in January, 1916. The company prepared a statement regarding the facts in the case, reporting the cost to the miners of permissible explosives for the eight months they had been in use, as against a corresponding eight months in a previous period when the miners were using black powder. From June, 1914, to January, 1915, inclusive, black powder was used and 130,935 tons of coal were produced at a cost to the miner of $0.0405 per ton. From June, 1915, to January, 1916, inclusive, 157,814 tons were produced, with permissible explosives, at a cost to the miner of $0.0378. This indicated that any difference in cost to the miner was in favor of permissible explosives. After studying these figures the miners agreed to continue to use permissible explosives. Mr. Brennan states that the use of permissible explosives in the Hanna mines has not in any way injured the preparation of the coal. The above figures are for coal 'mined' from pillars by shooting off the solid."

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## HIGH PRICES RESULT IN OPENING OF GRAPHITE DEPOSIT IN TEXAS

The increasing price of graphite has resulted in opening a number of new properties in the United States. Important among these is the mine at Burnet, Tex., owned by the Texas Graphite Company, in which George C. Mau, of San Francisco, is prominently interested.

The deposit has been developed to a sufficient extent to indicate that it is of more than usual value. Much of the graphite is of such high grade that it could have been marketed to advantage under normal conditions. Its presence has been known for many years, but the first effort to mine the graphite was made recently.

## PHOSPHORUS FROM IRON ORE MADE INTO FERTILIZER

Another striking instance of the economic evolution which is taking place in the United States today by reason of the European war has just come to the attention of the Bureau of Mines in the announcement that the United States Steel Corporation, through one of its subsidiaries, the Tennessee Coal, Iron & Railroad Co., has just completed a plant at Ensley, Ala., for the manufacture of phosphate fertilizer from its blast-furnace slag.

The Tennessee company, in its making of iron, has been at somewhat of a disadvantage owing to the relatively high phosphorus content of southern ores. Now it has discovered a plan whereby the excess phosphorus in these ores may be converted into a phosphate fertilizer with unusual plant-food qualities. The steel corporation has a double purpose in this, in that it not only removes the impurities from the iron ore but also turns these impurities into salable by-products, thus reducing the cost of iron making. The plant at Ensley is quite complete and is now in working order, but it is too early to give any definite statement as to the amount of phosphate that may be made and the importance of this phosphate in supplying the demands of the country.

The Bureau of Mines is extending its investigations of potash. F. K. Cameron, who has done notable work with the Bureau of Soils, will be added to the Bureau of Mines staff. Mr. Cameron is an expert upon fertilizing materials. Among other things he will write a bulletin on potash.

There are now four government bureaus engaged in investigations of potash problems. They are: The Bureau of Mines, Geological Survey, Bureau of Standards and Bureau of Soils.

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J. F. Callbreath, secretary of the Mining Congress, is spending the major part of his time in Chicago, looking after the preliminary arrangements for the 19th annual convention, which will be held at Chicago, November 13 to 17. He reports a great deal of enthusiasm, and the consensus of opinion is that the convention will be the largest ever held by any mining organization.

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J. C. Hoyt, of the Water Resources branch of the Geological Survey, is making an inspection trip which will cover portions of Colorado, Utah, Idaho and California. He will be gone two months.

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Ralph Arnold, formerly with the Geological Survey, and now in private practice, is in Venezuela, where he will conduct some investigations in the petroleum districts.

## GOVERNMENT EXPERTS WELL KNOWN TO MINING MEN

GEO. A. BURRELL
Inventor of Methane Indicator

George A. Burrell is in charge of the chemical laboratory for gas investigations of the Bureau of Mines, with headquarters at Pittsburgh, Pa., where the Bureau maintains its largest experiment station.

Mr. Burrell attended school at Ohio State University, and from there, in 1904, he accepted a position under Professor N. W. Lord, at the coal testing station of the United States Geological Survey. He connected himself with this work at the time Dr. J. A. Holmes became interested in it, and he is now the oldest man, in point of service, in the Bureau of Mines, considering that the Bureau's work began with the coal testing station in St. Louis.

From St. Louis, Mr. Burrell went to Denver in 1907, to take charge of the chemical laboratory of the coal testing plant established there, to study coking and washing of coal from the Rocky Mountain fields. He went to Pittsburgh in 1909, and took charge of the chemical laboratory for gas investigations. He rapidly developed this laboratory from a very small beginning to one where many investigations pertaining to gases have been made.

Mr. Burrell has published, all told, about forty-five articles dealing with various gas problems, including natural gas, gasoline, ventilation of coal mines and gas analysis data, compressibility, liquefaction, physiological effects, explosibility and other data regarding air.

Many gas testing appliances which Mr. Burrell has devised are being used in different testing laboratories in the United States. What he considers his best achievement is his gas detector, recently completed, which is the first reliable, simple and accurate detector for use in mines by inexperienced men. It weighs about one and one-half pounds and is practically all of metal. Firedamp can be detected with it in two minutes' time with an accuracy of one-tenth per cent. It is undergoing finishing touches at the present time in the Bureau's laboratories and shops, and will soon be available for use by the mining public.

Mr. Burrell has not entirely devoted his attention to coal mining, in that, he recently made a study of gases in the Cripple Creek district of Colorado, and also has made many studies pertaining to natural gas and gasoline. He published the only elaborate treatise on the casinghead gasoline industry, and he recently published the first account of a new process for the extraction of gasoline from natural gas by absorption methods.

Mr. Burrell was the first to show the true composition of natural gas by means of experiments performed at temperatures as low as 193 degrees below zero, centigrade scale. These temperatures were obtained by using liquid air. Several years ago he performed experiments that showed that natural gases, rich in heavy hydrocarbons, could be compressed and used from steel bottles for cutting and other purposes. Recent experiments by him show that natural gas measurements at high pressures will have to be revised, in that, in these measurements, natural gas companies have not taken into consideration the fact that natural gas does not follow Boyle's law.

It was principally through Mr. Burrell's experiments and recognition of the value of canary birds for use in mines that these small birds are used considerably in this country in mines following explosions and mine fires to warn rescuing parties of deadly carbon monoxide gas.

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A. Knopf, of the U. S. Geological Survey, has completed a field examination of tin ore at Elko, Nev. He also made an examination of tungsten deposits in the vicinity of Bishop, Cal.

## ALMOST ANY FUEL CAN BE BURNED SMOKELESSLY SAYS SPECIALIST

By proper combustion of the fuel almost any fuel can be burned smokelessly. It is a question of furnace design and the manipulation of the fire, according to O. P. Hood, of the Bureau of Mines. "The easy way is not the smokeless way, unfortunately," says Mr. Hood, "but if proper principles are observed both in the design and in the manipulation of the fire, as I say, even the so-called smoky coals can be burned almost smokelessly. If you add to that problem a little carelessness or considerable ignorance or a low ideal of what is possible, then you have smoke and dirt and grime. Those are the items which the Bureau of Mines is trying to fight.

"There are some few boilers, usually very old boilers, with which it would be very difficult to produce smokeless combustion with soft coal.

"Just now the Bureau of Mines, in its Pittsburgh testing plant, is making tests on some small housekeeping boilers for the Army that were originally designed for anthracite coal. We have something over 150 different fuels from all over the United States that we are burning in those furnaces, and we can burn the coal smokelessly; but that means that a little more intelligent care has got to be exercised and a little more frequent cleaning of the furnaces has got to be done, but it can be done, and it is done.

"A ton of anthracite coal has less potential heat in it than a ton of good bituminous coal. It is possible, however, by careless use of the bituminous coal to realize a smaller proportion of the potential heat of the coal in your hot-water or steam plant, or in your house, than by an equally careless way of using the anthracite coal. In other words, the anthracite coal is almost a fool-proof coal. That is not so of bituminous coal. But one who learns how to use bituminous coal can get through a year with a fewer number of tons of soft coal than he would use of anthracite. But it takes that little added care and 'know how,' which, unfortunately, most of our Americans will not give. We would rather pay out something more in the way of money than to use a little extra care."

## CHEMICAL PRODUCTS COMPANY BUYS LOW GRADE TUNGSTEN

The Chemical Products Co. has erected a large new reduction plant near Washington. The business of this concern has increased decidedly since it began operations here a year ago.

The Chemical Products Co. is engaged in reducing tungsten ores. It makes a specialty of the very low grade ores which find little market at other places. It also is one of the few firms which buys tungsten containing a large percentage of gangue.

## ARTESIAN WELLS MADE TO PUMP THEMSELVES

The field men of the United States Geological Survey, in their investigations of the ground-water resources of the Virginia Coastal Plain, have observed that the flows from many artesian wells in that region are utilized to drive hydraulic rams for the purpose of lifting the water to higher levels. Along the lower courses of the Potomac and Rappahannock and along the shores of the many inlets that run back from Chesapeake Bay above the James, there are hundreds of artesian wells that supply a perennial flow of beautifully clear water which is, as a rule, excellently adapted to all domestic uses and is largely utilized by the canning factories and other industrial establishments that abound in that part of the country. Though the pressure of the water from the wells is ample at the short level, the head diminishes so quickly with increase in elevation that no flow can be obtained along the higher banks above the shores where the water is most needed. The common method of obtaining it at these higher levels is to use the force developed by the artesian flow to operate hydraulic rams, which in turn raise the water to the heights desired along the bluffs above the river and inlets. Thus it may be said that the artesian wells pump themselves.

## MONTANA BEING SEARCHED FOR OIL AND GAS POOLS

On account of the increasing interest among oil men and in the possibility of developing oil pools in Montana where the oil and gas bearing formations of Canada presumably extend into the United States, an investigation of these structures is being conducted by the U. S. Geological Survey. This investigation is in progress at several points in the state.

One party is in charge of A. T. Hancock. It is studying the structure in a portion of the Yellowstone Valley, above Billings. Another party in charge of C. F. Bowen, is engaged in field examination of an area in the Mussel Shell Valley, near Roundup.

Structure favorable to the occurrence of oil and gas will be the object of a search by A. J. Collier and a Geological Survey party. This party also will map and classify certain coal lands in the northeastern part of Montana.

### Visits Magnesium Plants

The magnesium industry of the country is enjoying the greatest boom in its history, according to Frank L. Hess, of the U. S. Geological Survey, who just has returned from a trip to the more important producing centers in those states.

# APEX LAW CAUSE OF ONLY THREE PER CENT OF LITIGATION IN MINING STATES

## Attorney Compiles Statistics to Bolster His Contention That Extralateral Rights Feature of Present Mining Laws is Not Cause of Unusual Amount of Legal Controversy—Need of Law Revision Discussed

A feature of the mining laws much discussed and perhaps least understood, is known as the "extralateral rights" granted the locator of a mining claim. It is sometimes referred to as the "apex law." This extralateral right was known to miners at the time of the discovery of gold in California and was introduced into the first mining enterprise by the Mexican, English and continental miners. These early miners not only operated their claims with reference to this right but it was expressly granted by their rules and regulations adopted in practically all the mining camps, according to a well-known mining attorney. Others of his views follow:

The principle was not only adopted by the first miners in California, but it radiated to all the other mining districts of the Western States and became a fixed principle in all lode mining.

### MINING TERMS EXPLAINED

It was early discovered that veins of mineral-bearing ore were in the form of thin but broadly extended sheets standing or resting at a greater or less angle from the perpendicular, and that the upper edge of this sheet ran along near or at the surface of the ground, and this edge was variously denominated the "outcrop," "apex," or "top" of the vein. This edge, outcrop or apex, as it extended along the surface or more or less below the surface, was called the "strike" of the vein and the angle or downward course of the vein was known as the "dip." This dip varied from the perpendicular from a few degrees, to as much as 80 degrees.

Ordinarily, and in most of the mining districts, these veins have a continuity and an identity as distinct as that of the separate and several roots of a tree, and they can be followed on their dip generally with the same degree of certainty as a person digging down and discovering the root of a tree could follow it out to its remotest extent.

### MINING CAMP RULES

The mining claims from the first mining efforts were located on this upper edge or outcrop with a given number of feet extending on the strike of the vein. Under the rules of the mining camps generally the discoverer of a vein was allowed a double portion, twice as many feet on the strike as any other single locator. The claim was then laid on the surface in the form of a parallelogram, the end lines of the claim limiting the locator or miner in his operations on the strike of the vein while the side lines, supposed to run at given distances on each side of the center of the vein, simply measured the amount of the surface ground the miner was permitted to use in the operation or mining out his vein. In the early history of mining, little attention was paid to the side lines for the reason that the land was of no value except in connection with the mining enterprise and the miner was free to use any quantity required along the side of his outcrop, but the limitations on the strike of the vein were invariably strictly enforced and rights recognized and respected.

### METHOD OF WORKING

When a claim was thus laid the miner began his operations on the outcrop at the surface and mined out, down and into or upon the vein as it extended downward in its course. The vein between the end lines of his surface location belonged to him absolutely and he had the right to follow it in its downward course any distance that it might lead. Where side lines of his location were required he had the right to pass under these or through the vertical planes of the side lines extended downward and still follow the downward course of the vein the same as if there were in fact no side lines to his claim. These constituted no impediment or no limitation on his underground workings, but only limited his use of the surface of the land.

It thus appears that the term "extralateral rights" indicates the miner's right to follow his vein through or beyond the side lines of his location as made on the surface.

### BECAME FEDERAL LAW

When the first mining statute was enacted by Congress in 1866, the senators and representatives from the Western States, familiar with the effects of this extralateral right in practical mining operations, caused it to be incorporated in and made a part of the original mining statute of July 26, 1866. The provision in that act was to the effect that a miner could enter a particular tract and receive a patent therefor, "granting such mine, together with the right to follow such

vein or lode with its dips, angles, and variations, to any depth, although it may enter the land adjoining, which land adjoining shall be sold subject to this condition."

When this original bill was before Congress, Senator Conness, of California, in his answer to questions as to the meaning of the bill, said:

"The ordinary lands of the United States, not mineral, are sold according to what is called the rectangular system of survey, and always sold by perpendicular lines to the center of the earth. The necessity of varying that law in the sale of vein mines arises because all veins dip at a certain angle, varying frequently, but they always dip at an angle, never entering the earth vertically, and so they run in layers, one after the other. This bill in that respect simply conforms to what is both the custom and the law now—the old custom of the Mexican miners, adopted by our own people, and sustained by the decisions of our courts. Every man now has the right to follow his vein. . . . "

### A SENATOR'S OPINION

Senator Stewart, of Nevada, a practical miner, in further explaining the bill, said:

"To extend the preemption system applicable to agricultural lands to mines is absolutely absurd and impossible. Nature does not deposit the precious metals in rectangular form descending between vertical lines into the earth, but in veins or lodes varying from one foot to 300 feet in width, dipping from a perpendicular, from one to 80 degrees, and coursing through mountains and ravines at nearly every point of the compass . . . with such a division of a mine, one owning it at the surface and another at a greater depth, neither would be justified in expending money in cost of machinery, deep shafts, and long tunnels for working of the same. . . .

"If you sell in square sections with perpendicular lines extending into the earth, any quantity you please, one man may have a piece of half a dozen veins, and yet have no vein to work. To open a silver vein costs all the way from $50,000 to several million dollars, and to work it requires long tunneling, and it requires a system of timbering from the top. If a man has only a short piece, and is required to go into the earth by perpendicular lines, he might cut through several veins, but no system of working could be adopted. The veins are separated by rock walls, so that there is no possibility of confusion. You give a man a vein, or so many feet running with the vein, and following it down. Suppose, for instance, you give a man 3,000 feet. It dips forty-five degrees. If you were to undertake to give him that by your present system of selling the land by perpendicular lines, what would be the result? In order to work that vein he must have a large quantity of ground. It is supposed that the veins ordinarily have been worked down 3,000. Then you would have to give him an extent of 3,000 feet laterally. In these 3,000 feet there might be twenty or thirty other veins; so that under that system, in order to give him one vein you would have to give him a complete monopoly of the whole distance, or you would give it to him in a shape that he could not do anything. The practical necessity of the case requires that the dips of the veins shall be followed. A vein is an expensive thing to work, and any other system of sale would destroy the whole country; and that is the principal reason why the miners have been objecting to sales, because the perpendicular line would cut up their claims and no man would purchase. If you undertake to divide the lands in the mining country by having the lines extended perpendicularly, mining will be effectually at an end."

### NO CHANGE IN PRACTICE

The nature of mining has not changed. Mining operations are still carried on by following the dip of the vein from the surface downward. Even where perpendicular shafts are sunk by the discoverer of a vein the mining then begins and follows the dip of the vein. The ore found in veins or lodes could not be successfully mined in any other way. The practical value of a vein necessarily depends on the distance that it can be followed by the miner for the purpose of extracting the ore. The experience of the practical miner has taught him that the richest deposits do not appear in the vein nearest the surface but rather appear at a distance of several hundred feet down the incline and if the ore in the upper part or nearest the surface is of sufficient value to contribute somewhat to the expense of mining the operator is rewarded by the richer deposits further down the dip of the vein.

It is but natural that this extralateral right law and privilege has met with opposition. It is against the American instinct of property rights that one man should invade even the sub-surface of the lands of another owner. It is a fact that this right has been productive of difficulties and expensive litigation in some sections. Mining experience has taught that frequently the formations are faulty and regular veins disturbed and broken, and altogether too irregular to be followed, and under such circumstances the extralateral right rule has provoked conflict and litigation. If all veins were regular and ideal there certainly could be no objection to the extralateral right principle.

### AS TO LITIGATION

The chief objection to the extralateral right feature of the law, found in the mining literature and encountered among a certain class of critics, is because of the extensive and expensive litigation it has engendered. It is not infrequently asserted that capital refuses its investments in mining enterprises because of the dangers, the expense and the

litigation entailed upon the mining operations by reason of this feature of the mining law. Adverse criticism has practically abandoned every other objection to this provision and its repeal is demanded on this sole ground.

The history of mining litigation lends little support to the critics and affords too weak a basis for such a demand, if this objection is to stand as the only one.

LITIGATION ANALYZED

An inspection of the mining cases that have reached the highest courts in nine of the leading metal mining states discloses a very small per cent of the cases that involve any phase of the extralateral right law. The total number of cases involving the great variety of legal questions that have arisen out of the mining operations, cases that but for mining operations would not have been in the courts, the number involving the extralateral right law, and the per cent of the same to the whole number of cases, that have reached the highest courts of the nine leading metal mining states, is shown by the following table:

| *State* | *Mining cases* | *Extralateral right cases* | *Per cent* |
|---|---|---|---|
| Arizona ..... | 124 | 2 | 1.6 |
| California ..... | 764 | 11 | 1.44 |
| Colorado ..... | 452 | 21 | 4.64 |
| Idaho ..... | 149 | 3 | 2.00 |
| Montana ..... | 406 | 23 | 5.66 |
| Nevada ..... | 196 | 5 | 2.55 |
| New Mexico ..... | 47 | 1 | 2.12 |
| Utah ..... | 182 | 5 | 2.73 |
| Wyoming ..... | 11 | 0 | .00 |
| | 2,331 | 71 | 3.045 |

These totals show that in a period of 65 years of mining operations there have been 2,331 mining cases reaching the highest courts of these states, and in this long stretch of time a total of 71 cases that have involved, directly or indirectly, controversies growing out of these extralateral rights.

These 71 cases involving extralateral rights include instances where the litigation grew out of wilful trespasses, cases where one operator knowingly and purposely entered upon a vein belonging to another, as distinguished from an innocent trespass. The list also includes separate suits where one vein owner either with or without a pending suit has sought the order of a court to permit him to inspect the mining operations of the owner of a different vein.

LIST NOT COMPLETE

This list does not and cannot include cases that were terminated in the trial courts, either by judgment or compromise; but it is fair to assume that the relative per cent of the two classes of cases settled by judgment or otherwise, was not far different from those appealed to the highest courts. The fair presumption would be that a larger per cent of the extralateral right cases was appealed, from the fact that ordinarily greater financial interests were involved and the parties better able financially to appeal the cases. But for historical purposes the list is sufficiently correct and furnishes a conclusive answer to the demand for the repeal of this provision on the ground of expensive litigation.

Whether or not the extralateral right feature of the mining law is to be repealed should not alone be determined by mining engineers and those who study mining in its scientific aspect. If the law granting extralateral rights is satisfactory to the prospector and the practical miner, it should remain upon the statute books.

## CHICAGO CONVENTION AROUSING ETHUSIASM

The Official Call for the Nineteenth Annual Convention of the American Mining Congress to be held at Chicago, Ill., November 13 to 16, 1916, has been issued.

The preliminary work for the convention is well in hand. The program is very much more ambitious than that provided for any previous convention, and the interest thus far manifested is greatly in excess of that shown this much in advance of any previous convention.

Two whole floors of the Hotel La Salle will be occupied; the general meetings will be held in the grand ball room, and the sectional meetings will be held in different rooms on the seventeenth, eighteenth and nineteenth floors. In view of the importance of the work in connection with the convention the secretary will be located at room 214, La Salle Hotel after the first of August. The Washington office will be kept open to carry on the regular work.

The program committee will welcome any suggestions as to speakers and subjects and our members are urged to actively take part in the preparation for the convention as well as the convention itself. It is planned that the coming convention shall be the largest gathering of mining men ever assembled in the United States and the present indications are that this plan may be made successful. The cooperation of every mining man in the United States is requested.

## FEAR OF OUTRAGE KEEPS METAL MANUFACTURERS WORRIED

Many of the manufacturers of rare metals are operating with the greatest secrecy. This is made necessary, they declare, by the numerous threats made against them.

In some cases actual attempt has been made to burn or blow up their factories.

While some of their plants are contributing important assignments of war materials to the purchasing agents of the Allied governments, others are engaged entirely in producing products for domestic consumption. This latter class is no freer than the former when it comes to being the target for threats and attacks.

# FIGURES SHOWING COAL PRODUCTION BEING FURNISHED MORE PROMPTLY

## Cooperation by Railroads Serving Coal Fields Makes It Possible for the Geological Survey to Publish Early Statistics—Over 100 Lines Contribute Data for New Report—More Exact Figures Furnished Later

Hearty cooperation on the part of 104 railroads in the United States is enabling the U. S. Geological Survey to compile and publish additional and timely figures of coal production.

When C. E. Lesher took charge of the coal statistics of the Survey, a little over a year ago, he immediately took steps to ascertain the class of information collected by railways as to the coal shipments originating on their lines.

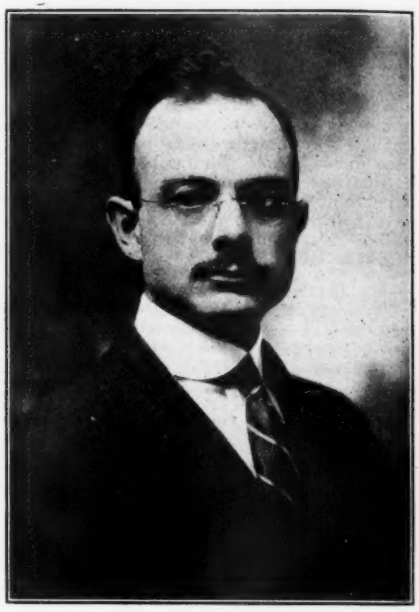
He found that nearly all railroads entering coal fields had available, promptly after the first of each month, statistics showing the number of cars containing coal and coke which were loaded on their respective lines during the previous month.

The railroads showed interest in the matter from the start, and are contributing the information requested with great promptness.

Blank forms with a franked envelope for their return are sent out from Washington the first day of each month. The blank calls for the total number of cars, or tons of coal, coke or lignite which originates on the line to which the request is sent. Very little information is requested, so as to make the burden of supplying data as light as possible.

The 104 roads which are cooperating in furnishing these figures reach the coal fields in every producing State. Ninety per cent of the bituminous coal, lignite and beehive coke produced in the United States originates on these lines.

These figures furnish much quicker returns on production than are obtainable from other sources. While they are not to be compared for exactness with those collected from the mining companies and available much later, they furnish a valuable check on the more detailed statistics and show the progress of the industry by months.



C. E. LESHER
In Charge of Coal Statistics, U. S. Geological Survey.

### Get Potash From Searles Lake

The Pacific Coast Borax Company is making successful evaporations of brines from Searles Lake, California. A number of samples of the potash product have been sent to the Geological Survey.

### Keith-Smith

Arthur Keith, in charge of the eastern areal work of the U. S. Geological Survey, was married, June 29, to Elizabeth M. Smith, of Washington. Miss Smith has been connected with the Geological Survey for a number of years.

### CALUMET AND HECLA GIVE MEDALS TO OLD EMPLOYES

A general holiday was declared by the Calumet and Hecla Mining Company on the occasion of the fiftieth anniversary of the opening of the Calumet and Hecla mine. The affair was largely an internal celebration among the employes of the company.

The company was host and served a bounteous dinner. Addresses were made and medals were distributed to employes of long service. Copper medals were given those who had been in the service between twenty and thirty years; silver medals went to those who had been with the company between thirty and forty years, while gold medals containing one ounce of the yellow metal were given all who had been on the pay roll of the company over forty years.

## HOOD EXPLAINS COMMERCIAL METHOD OF SAVING FUEL

The commercial method of attacking the problem of saving fuel is described by O. P. Hood, of the Bureau of Mines, as follows:

"Take, for instance, a large holding company that buys several electric plants or street railways. One of their first problems is to find out whether the cost of steam is a reasonable cost. Let us assume that they bought a dozen such plants. They send a betterment enginer, as they call him, to each of these plants. His powers are not restricted to the fuel problem, while our powers are, but this will illustrate the proposition.

"The betterment engineer tries to discover just how much steam is evaporated per pound of fuel. He usually asks the local management if they can give him such figures. and nine times out of ten those figures are not available. I think it safe to state that in the $8,000,000 worth of fuel burned by the United States Government, a fraction of but 1 per cent of that is burned under conditions where the cost of evaporating steam is known or can be readily determined. When we go from plant to plant we find the officials in charge do not have in operation methods that will enable them to answer the very first question of costs that a betterment engineer would ask, if he went into that plant.

"As this betterment engineer goes from plant to plant the local management is never in sympathy with him. You could hardly expect a local management who have believed that their methods were entirely proper and correct to welcome with open arms this man who is coming around to see whether they are really efficient or not. And so in the work of the Bureau of Mines in this connection, we can hardly expect the officials of the other departments and the other bureaus to say they will be glad to have us come and make an investigation of their plants and methods of operation.

"It is necessary to find the amount of coal as weighed and used per day and the amount of water evaporated by that coal and to know the methods of handling the furnace in order to obtain cost data.

"Now, after a statement can be made by the betterment engineer of the exact cost per 1,000 pounds of steam generated, this record is usually taken to the local management, who almost invariably express surprise. They were quite sure their costs per 1,000 pounds of steam were low and compared favorably with the best. As a matter of fact, poor operating results are usually due to lax methods, lax administration, and lack of concentration on a particular point, and such usually account for the poor results found by the betterment engineers.

"The betterment engineer then suggests changes. Those changes may be simply changes in the method of handling the furnace, or there may be a slight change in the furnace equipment, or it may extend to advising the use of a totally different kind of coal. It may be a poorer grade of coal, a grade of coal which can be bought for quite a good deal less, but with proper equipment and skill in firing it can be burned and the fuel bill greatly reduced.

"This function of the betterment engineer is not exercised in Government plants, except in rather rare cases, and then by organizations, limited in capacity and number, working in restricted fields, usually overworked, frequently overloaded with routine duties and in the end they generally rely on the fireman who handles the shovel.

"That is the proposition which the Bureau of Mines wants to meet."

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## BUREAU OF MINES MEN PLAN 10-DAY CONFERENCE

District engineers, foremen, and first-aid miners of the Bureau of Mines will hold at Pittsburgh the last half of August a ten-day conference of such members of the Mining Division as can be spared from their regular duties.

This conference is aimed to be educational and to make toward the standardizing of methods. The field employes will be informed of the latest developments obtained in the laboratories and in the experimental mine. There will be an interchange of information looking to the furthering of the Bureau's purposes in the field. Brief papers will be presented by designated leaders, followed by a general discussion in which each man will be expected to enter. Those employes not present will be given an opportunity to send in written discussion.

Drills will be given in first aid to train the men in the recently standardized methods laid down by the Committee of Consulting Surgeons. There will be a skeleton drill of mine rescue work at the experimental mine following an explosion. There will also be an investigation of an explosion of concealed origin to drill the men in systematic methods to be used in making such investigations. The taking and preparation of coal and of dust samples and of mine-air samples will be demonstrated.

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## SMALL STEEL PLANTS COMPETE SUCCESSFULLY WITH BIG CONCERNS

Experts here are surprised at the remarkable development which is taking place among small steel companies. Apparently these companies are doing a splendid business, and are having no difficulty in competing with the larger concerns. It is believed that this is being done by making grades of steel which require very painstaking processes. In this way a product is secured which is demanding a considerable premium over the average steel turned out by the big plants.

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D. H. Smith, of Los Angeles, who is prominently connected with tungsten mining, was in Washington recently.

## INTEREST IN GROUND-WATER SUPPLIES BECOMING GENERAL

One of the big recent developments in the building up of the arid and semiarid States is the recovery of underground water for irrigation. Formerly nearly all irrigation supplies were derived from surface streams, but two conditions have in recent years directed attention to the valuable supplies of water which are stored in the huge subterranean reservoirs underlying many of the desert areas of the West and which can be tapped by drilling wells. The first of these conditions is the rapid exhaustion of unappropriated surface supplies and the necessity of finding other supplies if the irrigation of the arid lands is to be extended; the second is the reduction in the cost of pumping due to improvements in pumps, the development of internal combustion engines, and the installation of large hydroelectric power plants.

### USE WELL WATER

When the last Federal census was taken more than a half million acres of land were irrigated in the United States with water supplied by wells, about three-fourths of which was pumped, the rest rising to the surface by artesian pressure. Since that time progress has been made in the recovery of underground water. At first ground-water irrigation was almost confined to a few regions, such as southern California, the Pecos Valley, and the Arkansas Valley, but now nearly all parts of the West are being prospected for ground-water supplies.

Owing to the diversity in geologic conditions the occurrence of underground water differs greatly from place to place. Many of the desert valleys have large and valuable supplies; but others which appear no less promising to the casual observer have little or no underground water or only water that in many cases has become too alkaline to be used for irrigation. The uncertainties attending ground-water developments are causing great loss and suffering to thousands of uninformed and inexperienced settlers and they are providing unscrupulous promoters with opportunities for misrepresentation.

### A GROUND-WATER SURVEY

Long before the interest in underground water had become as general as it is today the Geological Survey foresaw the need of a detailed ground-water survey of the entire West, and for years it has been engaged upon such a survey. Each year certain areas are selected for systematic investigation, the plan being ultimately to cover the entire West. A vast amount of reliable information has thus been obtained on the quantity, depth, and quality of the water, the prospects for artesian flows, the best methods of constructing wells, the cost of drilling and pumping, and other matters relating to the recovery and utilization of the underground supplies, and maps are made showing the ground-water conditions. These maps and data are published in a series of water-supply papers.

The region to be covered is, however, so extensive and the funds available for water-resources investigations have been comparatively so small that large areas remain in regard to which there is no definite information, and many years will be required at the present rate of progress to cover all of these areas, provided the work is to be done with the thoroughness that is essential to make it useful. Every year many requests for investigations of specific areas are received, some of them in the form of long petitions signed by the settlers. All of these requests are given careful consideration, but it is possible to respond favorably to only a few of the most meritorious.

### VALUABLE INFORMATION

The people's appreciation of this service is shown by the large number of requests for information and advice that are constantly received by the Geological Survey. Some of the water-supply papers are so much in demand that the editions for free distribution are exhausted within a few weeks after the papers are published.

The list of publications of the Geological Survey contains nearly 100 reports dealing with the underground waters of the Western States. The water-supply papers that are still in stock can be obtained by addressing the Director, United States Geological Survey, Washington, D. C. Many of them are now out of stock at the Survey, but most of these can be purchased at cost from the Superintendent of Documents, Government Printing Office, Washington, D. C. A complete list of the publications of the Survey can be obtained by anyone on application.

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## GEOLOGICAL SURVEY'S DIVISION OF GEOLOGY REORGANIZED

To lessen the administrative work of two chiefs of sections of the division of geology of the U. S. Geological Survey, the following reorganization has been made:

1. Section, Eastern Areal Geology, Arthur Keith, geologist in charge.
2. Section, Western Areal Geology, Sidney Paige, geologist in charge.
3. Section, Geology of Metalliferous Deposits, F. L. Ransome, geologist in charge.
4. Section, Geology of Non-Metalliferous Deposits, H. S. Gale, geologist in charge.
5. Section, Coastal Plain Investigations, T. W. Vaughan, geologist in charge.
6. Section, Glacial Geology, W. C. Alden, geologist in charge.
7. Section, Paleontology and Stratigraphy, T. W. Stanton, geologist in charge.
8. Section, Geology of Western Coal Fields, M. R. Campbell, geologist in charge.
9. Section, Geology of Eastern Coal Fields, G. H. Ashley, geologist in charge.
10. Section, Geology of Oil and Gas Fields, David White, geologist in charge.

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## EDITORIALS

### PROPOSED COPPER TAX UNFAIR AND VICIOUS

It is almost incomprehensible that serious consideration can be given to the proposal to single out a specific productive industry and to heap upon it burdens of taxation which are not assessed against other similar lines of business, and which in the end and during the greater part of the time which it will be in operation will fall most heavily upon the laborers engaged in the industry. Had not this proposal already been passed by the House of Representatives, the MINING CONGRESS JOURNAL would not give serious consideration to so vicious a proposal.

The proposition referred to is contained in H. R. 16763, otherwise referred to as the revenue bill, and is couched in the following language:

"Every person smelting copper ore or copper concentrates, refining metallic copper, or alloying copper, for each taxable year an excise tax equivalent to the following percentages of the gross receipts during such year of the sale or disposition of refined copper, or copper alloy, and from the sale of disposition of crude or unrefined copper if sold or disposed of for any purpose except for refining or alloying.

"One per centum of the amount by which such receipts exceed $25,000 and do not exceed $1,000,000; 2 per centum of the amount by which such receipts exceed $1,000,000 and do not exceed $10,000,000 and 3 per centum of the amount by which such receipts exceed $10,000,000."

This bill was passed by the House of Representatives by a vote of 239 ayes to 139 nays.

To establish the principle that special taxes shall be assessed upon any industry which temporarily becomes especially profitable would create an unstable basis for governmental support.

We hear much in these days about preparedness. If there is an industry in which preparedness for war and preparedness for peace, both require a continuous development, the copper industry must be so ranked. This particular industry has shown that in time of emergency it is able to supply a most vital requirement should this country ever be involved in war and in times of peace it has done its full share in bringing to this country a large percentage of the world's gold supply, which in its turn would be equally important for proper war equipment, should the future involve us in foreign complications.

The copper industry, through the income tax, the corporation tax, and the extraordinary burdens of state taxations, is already paying more than its full share for the support of the government, and the extraordinary tax proposed in this bill will become extremely burdensome when the price of copper shall again have reached a normal level.

The fact must not be overlooked that wages, a large part of production costs, are regulated by a sliding scale based on the market price of copper; and that copper mining is largely carried on at a few important centers employing large numbers of men, at which point no other vocation is open to those who are so engaged. To discontinue the sole support of a large population at points where other employment is impossible, and where food supplies are very costly and available only in exchange for cash, leaves the wage earner in the copper industry in a very serious situation. To select this one industry for special and unbearable burdens will be a political blunder likely to be resented by those who control the political destinies of some of the copper producing States.

## CONVENTION KEYNOTE IS COOPERATION

*(From the Official Call for the Nineteenth Annual Convention of the American Mining Congress)*

Cooperation for better conditions is to be the key-note of the convention. A better understanding between employers and employes is one of the most important subjects for consideration. The truth of the issues involved is to be told plainly but without offense. Conditions must be understood and faced if remedies are to be provided.

He who takes offense at a statement of the truth has need to revise his views or be a continuing hindrance to progress. If mistaken notions prevail no better plan of eradication is possible than through an open discussion in a friendly spirit with a view to bettering conditions.

Cooperation is the great need of the Mining Industry. The great purpose of the convention will be to inaugurate plans by which all branches of the mining industry may work together for the solution of common problems.

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## CHANGE OF BY-LAWS PROPOSED BY MR. SCHOLZ

A letter from President Scholz calls attention to the advisability of providing a different method of election of officers of the American Mining Congress than that which is now provided by the by-laws. The suggestion grows out of the fear that those members who are not able to attend the annual meeting and take part personally in the election of directors may be justified in suspecting that they have no part in choosing the officers who are to control the organization. It is most important that every member of the organization shall feel a sense of responsibility in the management of its affairs and it would seem wise that this matter should be publicly discussed through the columns of the JOURNAL in order that if a change of system is desired that it may be made at the coming annual meeting of the Mining Congress to be held during the week of the Chicago Convention.

In the early history of the organization when its activities consisted entirely of the annual convention composed of delegates only, the officers were elected at the annual meeting by the delegates present. Later, when the organization was incorporated and regular membership created, only active members of the organization were legally entitled to vote. As the organization assumed broader functions and its membership increased, it became increasingly difficult to secure the attendance at any meeting of a quorum of its members. The plan was then adopted to permit the absent members to be represented by proxy. This system has worked with reasonable satisfaction although the proxies have usually been centered in the secretary. While it is true that these proxies have never been used except to be counted for the making of a quorum and the members who were present at the annual meeting have always fully controlled the meetings, the proxies not being voted, yet the system is open to the objection that the secretary has the power to cast a controlling vote by this system.

The by-laws of the Congress have been frequently changed to meet the needs of changing conditions. A growing membership seems now to need a further change by which the members may have a more direct influence in the election of directors.

One difficulty, however, must be kept in mind, viz.; that a quorum of the board of directors must be present in order that the executive committee can be legally elected through which the executive functions of the organization may be made effective.

President Scholz proposes that there shall be a geographical division of the country made and that the by-laws shall provide that a certain number of the members of the board shall come from each of these geographical divisions. It seems also important that the members of the board of directors shall represent at least to some extent the various branches of the mining industry for which the organization undertakes to speak. It has been suggested that a committee shall be appointed to work out an entire

revision of the by-laws of the organization. The MINING CONGRESS JOURNAL will welcome a discussion of the subject. Members who have mislaid the by-laws will be supplied upon application to the secretary.

## MINE MANUFACTURING CAPITAL'S OPPORTUNITY

A recent editorial in the *Engineering and Mining Journal* digests very comprehensively the methods of mine development which have been most successful during the last few years, and points out very clearly that the rejection by the larger development companies of a mine which had been offered, does not reflect upon the proposition offered, because the very same mine might be desirable to some other company, or at some different price. The editorial says:

"Not only is the field of opportunity not barren, but there is a marked need of an exploitation company for the handling of comparatively small properties."

The MINING CONGRESS JOURNAL has repeatedly urged the importance of the development of prospects, and has pointed out the importance of having other mines available for the utilization of capital, brains and energy now employed in mines which sooner or later will be exhausted. It has pointed out the importance of contemporaneous development of a large number of prospects in order that the loss entailed by the unsuccessful development of some prospects may be offset by the success in the few which become profitable mines.

The manufacture of mines (the development of prospects), offers a field giving promise of large profits to capital and great benefit to the communities in which the development work is done.

## FOSTER WORKS HARD FOR MINING APPROPRIATIONS

Dr. Martin D. Foster, Chairman of the House Committee on Mines and Mining, is entitled to much credit for the active way in which he fought for the increased appropriations for the Bureau of Mines. He was tactful and determined throughout and to him in no small measure is due the success of legislation which has added materially to the appropriations allowed to this Bureau.

Despite the fact that Dr. Foster is very much opposed to the American Mining Congress' recommendation that a commission be appointed to study the needs of the country with respect to mining laws, we can say that there is no doubt as to Dr. Foster's conscientiousness. We are very certain that he is only being true to his convictions in his efforts to prevent the carrying out of this recommendation.

Regardless of the fact that few of Dr. Foster's constituents are interested in mining, it can be stated that he is a very hard worker in the interest of the mining industry. We never have given up the hope that Dr. Foster will yet be convinced of the absolute necessity of a revision-of-laws commission. Once that he is convinced, he is the type of man who does not hesitate to change his position, and it may be that he will become just as ardent a supporter of the American Mining Congress' recommendation as he has been its opponent.

## SHOWS CONFIDENCE IN BUREAU OF MINES

If no additional appropriations are granted during the next two and one-half years, the Bureau of Mines, through additional funds to be provided for mining experiment and mine safety stations that have already been authorized by Congress, will have the direction of an annual expenditure aggregating $1,500,000.

The value of the work being done by the Bureau of Mines is so evident that Congress is showing more than ordinary confidence in this Bureau, and each year is placing additional funds in its hands to aid the mining industry.

What better improvement could be made than to install and adopt the electric method of firing explosives instead of the old method of fuse and blasting cap?

# LITTLE HARDSHIP WITH MUCH PLEASURE AND PROFIT IN TRIP DOWN THE YUKON

## Geological Survey Official Gives Detailed Information as to the Needs of Such a Trip— Skiff Made on the River More Appropriate for the Journey Than a Canoe— Summer Clothing Only Needed

An official of the Alaskan division of the Geological Survey has answered a request for advice as to a trip down the Yukon as follows:

A trip from Whitehorse to Tanana Alaska by canoe can be undertaken with very little hardship or inconvenience by anyone used to roughing it and with a fair assurance of pleasure and profit, depending, of course, upon the temperament and tastes of the persons involved. There are few rivers that offer scenery, climate, and ease of travel equal to this reach of the Yukon. From Whitehorse to Lake Lebarge the river is 200 to 300 feet wide and flows through a broad silt-filled glaciated valley. The lake is a beautiful, clear blue body of water, thirty-four miles in length, comparatively narrow and bordered by low glaciated hills that preserve to a great degree the marks of the last ice advance. Below the lake the clear blue waters of the Thirtymile River follow a sinuous course through a continuation of the same glaciated depression to the mouth of Hootalinqua River where the more turbid waters begin.

Below this point to Dawson the river increases in size and velocity, and the valley, losing its broad, open aspect, becomes almost gorgelike in form, cutting through uplands 2,000 to 3,000 feet higher than the stream. From Dawson to Circle the river is nearly half a mile in average width, and the valley retains its deep and narrow form. The current here is 5 to 7 miles an hour and fine progress can be made without effort. Below Circle the river spreads into numerous channels in a great silt-filled basin known as the Yukon flats within which, at Fort Yukon near the mouth of Porcupine River, it reaches its most northerly point, within the Arctic Circle. About 200 miles below Circle, at old Fort Hamlin, the Yukon leaves the Flats and enters the first of a series of gorges that occur at intervals the rest of the distance to Tanana.

### CLIMATE DELIGHTFUL

The climate of the region during the season mentioned is generally delightful. The weather is usually clear and warm, temperatures ranging betwen 50° and 80°, night and day, and with little wind or rainfall. The rain is mostly from local thunder storms of the middle western type.

The current of the river throughout this reach is good, ranging from 4 to 7 miles an hour, so that good progress can be made with little exertion. It is necessary only to keep in the current, look out for sweepers or trees leaning out over the water along cut banks, and to seek local advice about the Five Finger and Rink Rapids, which lie halfway between Whitehorse and Dawson. Experienced boatmen have no difficulty in running the right channel of the Five Fingers and in going down the right bank at the Rink Rapids. There is a bit of swift water in the Lower Ramparts half way between Rampart and Tanana, but it is all clear and safe on either side of mid-channel where a rocky island is generally exposed.

A canoe is not essential for the trip unless side trips up tributary streams are planned. A more economical type of boat and one more comfortable for floating on the main river is the so-called Yukon skiff, which may be bought from local builders at Whitehorse for $15 to $20, according to size. These boats are steady and have lots of room, so that a stove may be set up on board and cooking done en route—a common practice with "floaters." Such a boat will carry 1,000 pounds or more of luggage without crowding, permitting cots, camp chairs, and a steamer trunk to be carried if one desires such luxurious equipment. The Yukon skiff is a flat-bottomed, square stern boat, 16 to 18 feet long and 3½ to 4 feet wide at top of flared gunwales. The stove commonly used is made of sheet iron and may be bought at any settlement.

### MOSQUITOES BOTHER

The mosquitoes and gnats bother one very little while on the river, but they are very troublesome on shore, and it is essential to have a mosquito-proof tent for sleeping quarters. A very satisfactory type is made for Survey parties by the Seattle Tent & Awning Co., Seattle, Washington—an 8x8 tent costing $25 to $30. An extension fly of similar size, to be attached in front of the sleeping tent, under which cooking may be done, can be added for about $15. An asbestos ring for the stove pipe should be used if the stove is to be set up under shelter.

It is also essential to have mosquito nets and gloves for use on shore, especially at evening. A good type of head net is sold by C. C. Filson, Seattle, for 75 cents. Ordinary summer-weight clothes will be generally worn, but a mackinaw or slicker is handy for rainy days. Hobnailed surveyor's boots and rubber wading boots worn over heavy wool socks are best footwear on shore.

The principal fishing will be found on the clear-water tributary streams rather than in the main river. Grayling are available in practically all such streams and may be taken with ordinary rod and fly. Brook trout are abundant on many of the swift tributaries, more so perhaps near their headwaters than farther down. An excellent small white fish can be caught along the margins of the Yukon by gill-netting, and a small net set at evening usually will catch a nice breakfast by morning. A fine 1½ mesh net has been used successfully by Survey parties for this purpose. Salmon run far up the Yukon and may be had for little or nothing from natives or local fishermen after the first of July.

MOOSE AND BEAR ABOUND

Moose and bear are seen not infrequently along the Yukon, and local inhabitants can direct one as to best localities for special hunting and also concerning game laws. However, as meat will keep for only a limited time during the summer months, it seems hardly worth while to kill a large animal for the sake of a few days' rations for a small party. Geese, ducks, cranes, etc., are to be found on lakes and bayous along the river and on the tributary streams, and a good shotgun is probably more satisfactory for supplying the larder than a large caliber rifle. Ptarmigan are to be had on the high hills during the summer and grouse are generally plentiful in the timber along the streams. These birds are easily killed with a .22 caliber rifle, and this weapon is generally used for the purpose by Survey parties.

Supplies may be purchased at any of the settlements along the river, so that it is unnecessary to take a complete outfit from the States or from Whitehorse. Horses for side trips may be hired at any of the settlements below Dawson.

The lower river is more or less monotonous, especially below the Koyukuk. Side trips on the upper Yukon would probably prove a more interesting way to spend time.

PUBLICATIONS

Among the publications of general interest to one contemplating such a trip are: "Early Days on the Yukon," by Ogilvie. "Through the Yukon and Alaska," by Richard; and "Handbook of Alaska," by Greely. Maps and reports on the upper Yukon, in Canadian territory, may be obtained from the Geological Survey of Canada, Ottawa, Canada.

If a canoe is desired a moderate size (17 or 18 foot, No. 66x, 67x, or 68x) Peterboro will probably be found best. In this event one may write the Peterboro Canoe Co., Peterboro, Ontario, Canada, for catalogue and list of their Pacific Coast agents. Unless the company has an agent in Whitehorse the canoe should be taken from Seattle, Victoria, or Vancouver. It possibly would be best to have it shipped direct from Vancouver or Victoria to Whitehorse to simplify customs charges. No duty would then be required excepting on entering American territory at Eagle. The canoe will cost, including purchase, freight, and duty, at least $100 more than the skiff, and the latter will be more satisfactory unless one is ambitious to paddle or want to run up the tributary streams. If a canoe is taken it would be best to fit it with oars.

The people of the district are cordial and willing to furnish information and advice.

## New Publications Announced

The Bureau of Mines just has received for distribution the following:

Bulletin 106. The technology of marble quarrying, by Oliver Bowles.

Bulletin 115. Coal-mine fatalities in the United States, 1870-1914, with statistics of coal production, labor, and mining methods, by states and calendar years, compiled by A. H. Fay.

Bulletin 118. Abstracts of current decisions on mines and mining, reported from October to December, 1915, by J. W. Thompson.

Technical Paper 117. Quantity of gasoline necessary to produce explosive conditions in sewers, by G. A. Burrell and H. T. Boyd.

Technical Paper 121. Effects of temperature and pressure on the explosibility of methane-air mixtures, by G. A. Burrell and I. W. Robertson.

Technical Paper 145. Sensitiveness to detonation of trinitrotoluene and tetranitromethylanilin, by G. B. Taylor and W. C. Cope.

## Working in South America

D. F. Hewett, of the Geological Survey, is in Peru, South America, conducting some geological work for a private mining concern.

Geologists connected with the Survey are permitted to do a limited amount of private work in foreign countries. The education that they acquire in this manner while on leave without pay is of decided advantage to the Federal service.

## Maximum Execution Assured

When explosives are detonated electrically, the maximum execution is always assured. The blast cannot occur until the miner desires it and when everyone is in a safe place. As many holes can be fired at one time as desired so that it is possible to use less explosives per ton of coal than when fired by fuse and blasting caps.

(Continued from page 349.)

collector from taking the tax from the owner of a large amount of cotton. The point was made that this was a direct tax which could not be legally collected and that as cotton could be raised in only one locality, that the imposition of the tax was in contravention of the uniformity clause of the Federal Constitution. The lower court refused to issue the injunction, and an appeal was taken to the Supreme Court, but no decision was had for the court, even in that day of intense prejudice, evenly divided on the questions submitted.

But, Mr. Chairman, whatever the court may or may not hereafter hold, the fact remains that the tax is discriminatory, laid without reason on one particular product, and laid with such a heavy hand as to bankrupt many struggling mines in my State and falls on labor as heavily as on the capital invested in the production of copper. Much of our labor is paid a scale depending on the net price of the copper produced by it. This tax is a direct imposition on the men working in the mines. They at last must pay at the point of production. Copper is high today, it may be low tomorrow. The price is already declining, and must expect further decline when Europe shall have regained its senses and turned to paths of peace, just as zinc, lead and steel will decline, but probably in a smaller ratio, for as Senator Walsh has shown that the export of copper has been about the same through the war period as it was before the war started, while bar steel increased its exports from $2,000,000 worth in the first four months of 1914, to $14,418,000 for the same months in 1916. Even a greater increase in exports is shown in zinc, pig iron and lead, and the prices of all of these untaxed metals rose equally with copper and some of them command and still hold prices much in excess of any rise in the copper market.

In view of these facts, can it enter into the mind of man to conceive the reason for specializing copper for enormous taxation by the Federal Government? It bears a great part of the burden of taxation for the support of my State, and the other few States in which it is found. Enormous sums of money have been expended in developing paying mines of copper, and in the aggregate still larger sums have been spent on mines that never paid.

Mr. Chairman, I will conclude as I began, by commending the argument of Senator Walsh to your thoughtful consideration. He has left little, if anything, to be said by me or anyone in defense of our position, and I have detained you this long, more for the purpose of recording my determined and unflinching opposition to the imposition of this unjust tax rather than to throw any further light on the question at issue.

### LETTERS PUT IN RECORD

Senator Smith made a part of the record in his testimony a number of letters from authorities on copper which contains some splendid arguments. These letters were from Walter Douglas, vice-president of the Phelps-Dodge Company; L. D. Ricketts, of New York; C. H. Akers, president of the company publishing the Phoenix Gazette, and Charles F. Willis, Director of the Arizona Bureau of Mines.

A very strong argument was made against the tax by H. H. Boyseen, of the American Brass Company of New York. This Company makes about half of the brass manufactured in this country. He testified that the company buys all of its copper and zinc in the open market and does not produce a single pound of metal itself. He also pointed out that 85 per cent of the brass now being produced in the United States is going into peaceful uses. Alfred B. Reeves, representing the United States Metal Refining Company, stressed the point that copper is no more a munition of war than is cotton.

If no other reason exists for the elimination of this tax from the bill it would be justified by the fact that it would put a stop to the successful business that is beginning to be built up in this country in the smelting of foreign ores, stated Julien B. Beaty of New York, representing the American Metal Company, who appeared before the subcommittee.

A valuable contribution to the record on the copper situation was a brief by Vice-President Kelley of the Anaconda Copper Co.

Senator Warren called the attention of the Senate to the following telegram from the Utah Chapter of the American Mining Congress. He inserted the telegram in the *Congressional Record*. It reads as follows:

> We note that the Ways and Means Committee has reported favorably on a proposed bill to tax copper smelting and refining for additional revenue. We, representing the mining interests of Utah, seriously object to the passage of such bill, classing the copper business as war industry. If the law is enacted it will seriously injure mining companies and be a great blow to mines in the Western States. Utah Chapter of the American Mining Congress solicits your earnest efforts to defeat this provision of the revenue act.

In protesting in the House against the tax on copper, Mr. Hayden said:

"I have offered this amendment because, after careful consideration, I have reached the conclusion that the proposed tax on copper is unjust in that it discriminates against the leading industry of my State.

"It is true that the bulk of this tax will be collected from the refiners and alloyers of copper, but I trust that no member present will insist that the revenue thus obtained will actually come out of the pockets of those who 'manufacture' copper, as the bill describes it. The refiners and alloyers cannot pass the burden on to the consumers by adding the tax to the price of their products, because refined copper and brass are sold in a world market, where the price is regulated by supply and demand. But the refiner can, and will, recoup himself by either increasing the refining charges or by reducing the price paid for unrefined copper. Therefore, this is a tax upon production that must ulti-

mately be paid by those who mine copper ores.

"This tax dates back to January 1, 1916, and the amount due for this calendar year must be paid on or before April 1, 1917. The United States Geological Survey recently estimated that at the present rate of production over 600,000,000 pounds of copper will be produced in Arizona in 1916. This is nearly twice the output of any other State, and represents over one-third of the copper produced in the United States. Six hundred million pounds of copper at an average price of 25 cents a pound equals gross receipts aggregating $150,000,000 that will be subjected to taxation. The maximum tax under this bill is 3 per cent, but presuming that advantage is taken of that other provision of the bill which allows a net profit of 10 per cent on the amount actually invested in the 'manufacture' of copper, still it is safe to assume that this tax will yield a return of 2 per cent on the gross output. In that event, at least $3,000,000 will be collected from the copper produced in my State.

"Now, those who mine copper in Arizona are as patriotic as any other body of Americans. They are willing to pay a fair share of the cost of preparedness, but they do object to having copper singled out for double taxation while no such discrimination is practiced against any other metallurgical industry. As a matter of fact, this bill provides for triple taxation of large quantities of copper. First, the refiner must pay a tax on the gross receipts of his business. Then the alloyer, who purchases the refined copper that has once been the basis of a tax, is taxed on his gross receipts. The alloyer sells brass to a munition maker, who must pay a tax on the gross amount he receives for the cartridges and other war material he has sold. A pound of copper that follows this course will, in all probability, be used as a basis for at least a 2 per cent tax paid by the refiner, another 2 per cent tax paid by the alloyer, and still another tax of at least 4 per cent paid by the munition manufacturer. I am sure that the Committee on Ways and Means could not have given much study to the effect of this double and triple taxation of copper or certainly they would not have included this form of raising revenue in the bill.

"I do not offer this amendment upon the theory that it will confer a special privilege upon the copper producers of my State, but I do insist that they shall not be discriminated against.

"We are all agreed that the munition industry has been enjoying exceptional prosperity and the profits derived therefrom are therefore a fit object of temporary taxation. We know that this industry has reached its maximum growth and no one contends that this unusual tax is expected to remain on the statute books for more than a year. Except as to copper the tax will practically repeal itself when the shipments of munitions to Europe shall cease. I understand that the committee considers that the necessity for this tax will end whenever the inheritance tax is in full operation.

"The production of copper, upon the contrary, is a permanent industry the prosperity of which is vital to our national welfare. Without asking for or receiving any favoritism by legislation, such as a protective tariff or any other special privilege, the output of copper has steadily and legitimately increased until the United States now leads the world in the production of this red metal, without which the present electrical age would be impossible. Why, then, should this, rather than the other metallurgical industries, be especially chosen to contribute to the cause of national defense at this time?

"It is true that the producers of copper are now enjoying great prosperity, but they have justly earned this reward by passing through a period of depression as the result of embargoes and unfriendly legislation like the English orders in council declaring copper to be contraband. Shortly after the beginning of the European war the production of copper almost ceased, and thousands of miners were either thrown out of work or employed on half time at reduced wages. Under the circumstances I feel that the copper industry should, in all fairness, be allowed to enjoy its present prosperity. I suspect that the real reason for this tax is that the committee has associated copper with munitions on account of the large amount of this metal that is used in making war material.

"I would like to inquire why copper has been taxed in this bill and no tax has been placed upon steel? If copper is to be taxed because it enters into the manufacture of munitions, why has not steel been taxed for a similar reason?

"This tax, like any other element that enters into the cost of production, will have nothing to do with the price of copper. But steel is used to make cannon and shells, small arms and other war use from barbed wire to battleships. Yet there is no tax on steel ingots or billets in this bill. If there is to be double taxation of copper because it is used in making munitions, why should not steel also be twice taxed? Everyone knows that vastly more steel and iron is used in modern warfare than any other single metal.

"In addition to copper and iron all of the other metals have advanced in price owing to the demand created by the European war. Lead and antimony are used to make bullets and shrapnel. Aluminum is required for aeroplanes, Zeppelins, and automobiles. The manufacture of projectiles and armor plate makes a market for nickel, and quicksilver is used to make priming explosives. A vast quantity of zinc is consumed in the form of brass and to galvanize barbed wire. If copper is to be taxed, why ignore these metals? There is no double taxation on any of these articles in this bill.

"As a matter of fact, the greater part of the copper produced in this country is used in our domestic arts and industries. In 1914, when such a thing as exporting munitions of war was undreamed of, over 700,000,000 pounds of copper, or about one-half of the total production, was consumed in the United States. It is safe to say that even a larger amount of copper will be used this year in America in a manner not even remotely connected with the war. Cer-

tainly it is a misnomer to call this a munitions tax when the greater portion of the copper upon which the collections are based is used for peaceful purposes.

"It cannot be possible that this tax is to be levied merely because the copper industry can afford to pay it. I hope this House will not settle upon the policy of taxing prosperity whenever it appears. The English kings practiced that kind of extortion on the Jews of York, but no political economist will recommend such a proceeding, even as an extraordinary method of raising revenue.

"If Congress is to tax the copper industry because it is profitable, then consistency demands a like tax on steel. Only last Saturday Henry Clews, that great student of financial and business conditions, gave out this statement:

" 'The steel trade positively is suffering from overconsumption. Production is operated at the limit, yet there is no cessation in the pressure of orders, no signs of weakness in prices, and the steel mills would welcome a respite from the urgent demands of consumers.'

"I defy anyone to name a copper stock that has advanced from $30 to $530 a share, as did Bethlehem steel as a result of the munitions traffic. Why should not the steel industry, that pampered pet of protection, whose demands have been insistently presented to the American people in every political campaign for the past fifty years, after having been fed with favors by law, now that it is prosperous why should not its profits be directly taxed to pay for a program of preparedness that will require more steel than any other metal? There are no two ways about it. Either steel should be taxed or copper should not.

"There is a matter I want to draw to the particular attention of the friends of labor in this House. I have been discussing this tax from the point of view of the owners of the producing mines in Arizona whose property is assessed this year for purposes of State and county taxation at a valuation of over $170,000,000, but I would have this House remember that Congress cannot levy a copper tax which will not also be a burden upon the 30,000 men who are employed in mining and ore reduction in my State. More than $35,000,000 will be paid in wages this year to these men, but the wage varies directly with the price of copper. If you put this tax on copper, you reduce the wages of the men employed in its production. I ask you to impose these taxes in such a way that no part of the burden can be shifted onto the laboring man.

"A tax of 2 per cent on copper at 25 cents a pound means only a half cent on each pound, which does not sound like a very heavy burden. But a half cent a pound on 600,000,000 pounds means $3,000,000 that must be raised from the copper industry in Arizona. Does anyone here believe that those who labor in Arizona's copper mines will not share this burden? The friends of labor in this House will therefore vote with me to prevent a reduction in the wages paid to the miners and smelter men of the greatest copper-producing State in the Union.

"The gentleman from Tennessee has said that there are two supreme duties which a citizen owes to his country—to fight for it and to pay taxes. In answer to the President's call for soldiers to protect the Mexican border there are more men under arms today from Arizona in proportion to her population than from any other State in this Union. Not content with receiving this liberal offering of the blood of her sons to defend the Nation, this bill proposes to seize the treasure of Arizona by an unfair and discriminating tax upon her leading industry. I would be unfaithful to the trust that has been reposed in me if I did not raise my voice in protest against this injustice."

### CONDEMNS TAX

Commenting on the tax on copper, the Washington *Post* recently said editorially:

It was natural that the citizens of Montana, Arizona, Utah, Michigan, Connecticut and New Jersey should strongly protest against the proposed tax on copper. There can be little doubt that after the Senate has carefully considered the matter, this particular item of the revenue raising bill will be eliminated.

While such a tax would not be popular politically, it is upon entirely different grounds that the Senate must consider the matter. In all probability the tax on copper would be unconstitutional, but, more than that, it would be so unjust that the Senate is not likely to permit it to stand in the bill.

There is no more excuse for including copper under the heading of "munitions of war" than there is for including cotton or foodstuffs. The mere prosperity of an industry certainly is not sufficient cause for discriminatory taxation.

Copper does not enter into the manufacture of munitions any more than steel, lead, antimony, aluminum, quicksilver or zinc. Any one of these ingredients of munitions might have been taxed under the same specious argument. The revenue bill, however, not only hits copper once, but three times. Under the terms of the measure as sent to the Senate by the House, the refiner must pay a tax on the gross receipts of his business; then the alloyer must pay, and finally the munitions manufacturer who turns out the finished product must pay. In all probability there would be a 2 per cent tax paid by the refiner, another 2 per cent paid by the alloyer, and still another tax of 4 per cent paid by the munitions maker.

Direct taxes are never welcomed very warmly by the people, but if they are not discriminatory they must be regarded as inevitable.

Since taxation at the present time seems to be inevitable, it is for the Senate to see to it that there is no injustice or unfairness. A copper tax has no place in the revenue raising bill. It is understood that the Senate will eliminate the tax and such a result will be gratifying, as an evidence of the Senate's sense of justice, even to those who are not in any way affected by the proposed levy.

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## DU PONT COMPANY PROTESTS AGAINST MUNITIONS TAX

In a letter to members of the House Committee on Ways and Means, the du Pont Company, powder makers to the belligerent countries of Europe, present the "other side" of the Democratic proposal to tax heavily the production of munitions of war. The mining industry is directly interested in the munitions trade since it is one of the largest consumers of metals.

No hearings were held by the House Committee before it reported the emergency revenue bill. The du Pont Company presents arguments that the bill discriminates against the makers of explosives.

It is claimed that the bill means double taxation for the munitions makers—because they pay an income or corporation tax on net income and a special munitions tax on gross receipts.

### POINT TO OTHERS

The argument is also advanced that manufacturers of other articles that have been exported in large quantities and at high prices escape special taxation, the munitions makers being singled out in casting about for a levy on "war orders."

For instance, the du Pont Company says that millions of dollars' worth of automobiles, aeroplanes and parts, rubber and woolen goods have gone to the belligerents, but there has been no proposal to tax this class of war trade.

While admitting that munitions makers have had good contracts and dividends, attention is called to the temporary nature of the traffic and the vast improvements that have been made at heavy expense to meet the demands. Owing to the interest of the mining industry in this question the letter from the du Pont Company is reproduced in its entirety, as follows:

### TEXT OF LETTER

"Claude Kitchin, Chairman, Ways and Means Committee, United States House of Representatives:

"Dear Sir:

"The du Pont Company desires to submit to the Ways and Means Committee, House of Representatives, and to other members of Congress, certain facts bearing on the manufacture of 'gunpowder and other explosives,' taxation on which is provided in H. R. 16763.

"We regret that we did not have an opportunity to be heard before this bill was framed, and refrained from requesting a hearing because we felt that any suggestion volunteered might be misconstrued. However, the proposed tax is of so vital interest to this company and the 60,000 men now in our employ that we feel justified in sending you this communication.

"1. This bill makes the du Pont Company and other manufacturers of explosives the subjects of double taxation—that is, it places a tax on net income and on gross receipts.

### POINTS OUT DISCRIMINATION

"2. The bill discriminates against the manufacturers of explosives, singling out their industry for drastic treatment amounting to penalization, while others engaged in the manufacture of munitions of war and making equal or greater profits are permitted to go free. For example:

"From the beginning of the war, to and including April last, there were exported from the United States for military purposes:

| | |
|---|---|
| "Auto trucks and passenger automobiles to the value of | $142,000,000 |
| "Aeroplanes and parts | 7,800,000 |
| "Motorcycles | 4,162,000 |
| "Rubber, including automobile tires | 41,800,000 |
| "Woolen goods | 70,000,000 |

### NO GREAT PART OF EXPORTS

"Imposing as these figures are, they involve no great part of the nation's exports and a trifling part of its total profits attributable to the war. There could be added to the list such articles as canned meats, army rations of various kinds, shoes, harness, saddles, blankets, kerosene, gasoline, acids, alcohol, locomotives, parts of submarines, range-finders, stamped metal, military equipment, swords, bayonets, bromine and other military gases, barbed wire and other products of iron and steel.

"Indeed the list would include the products of almost every line of effort and industry. While we would not advocate a tax thereon, your attention is called to the fact that horses to the value of $128,872,000 and mules to the value of $31,186,000 have been exported for military purposes.

"3. The bill requires the payment of 8 per cent tax on large sales. This leaves a profit too small for the risks of explosive manufacturers. If 10 per cent is the maximum, no one can afford to take the risk of the minimum. This 10 per cent must be a maximum in many cases, if not in all, as all the profits above that amount are retained by the Government until a certain percentage of profits is reached, depending on the relation of sales to investment.

### IF SALES ARE DOUBLE

"Thus if the sales of a corporation are double in value the manufacturing investment, 26 per cent must be earned before the company is allowed to retain more than 10 per cent. If the gross sales equal three times the value of the manufacturing plant, 34 per cent must be earned on capital invested in order to produce returns beyond the 10 per cent allowance of the bill.

"In other words, if the sales are double the plant value, the Government will receive 60 per cent of the total profits when the earnings are 26 per cent on the investment; and if the sales are three times the value of the investment the Government will receive 70 per cent of the profits if the investment yields 34 per cent, and in no case will the manufacturer receive more than 10 per cent on his investment.

"4. Why should 'gunpowder and other explosives' be singled out for discriminating, burdensome taxation even as compared with other materials classed as 'war munitions' on which the bill provides taxation? This is to say, why should a dollar received from gunpowder, or some other explosive, bear a tax of 8 per cent, while a dollar received from the gun that burns this gunpowder bears a tax of only 5 per cent, and the copper for shell cases but 3 per cent?

### COPPER VALUE DOUBLED

"The value of the last named commodity (copper) has more than doubled since the outbreak of the war, with no material increase in the cost of production; whereas, the raw materials entering into 'gunpowder and other explosives' have advanced in some instances as much as 2,000 per cent.

"For example, short-fiber cotton has advanced

from 2 cents to 8 cents per pound; toluol from 20 cents to $4.00 per gallon; benzol from 20 cents to 80 cents per gallon; fuming sulphuric acid from $15 to $150 per ton. Meanwhile there has been a constant reduction in the price of smokeless powder due to competition and market conditions; present prices having fallen below the level that obtained before the war. The maximum price reached at no time a 20 per cent advance over previous prices for foreign business.

"5. To make possible the production of explosives to meet the unusual demands, large sums have been invested in construction and equipment, the intrinsic value of which is maintained only in proportion to the use thereof. This represents capital invested largely from proceeds of munition sales and cannot be construed as legitimate taxable profits for reasons of depreciation of value as above noted. To the extent that future markets do not permit of the operation of these extensive plants, their intrinsic value is that of scrap only.

WOULD MEAN DISASTER

"6. The retroactive feature of this bill would ordinarily mean absolute disaster to the manufacturer of 'gunpowder and other explosives.'

"The foreign business that came to us was embraced in many orders representing 180 separate and distinct contracts. Most of these contracts have been completed, the money paid and distributed; some of it to stockholders, much of it being invested in other industries. Many of the stockholders who were the beneficiaries of this advance have disposed of their holdings.

"When these contracts were made, no such expense item as this was considered in fixing the price of our product. It is impossible now to distribute in any manner this additional burden, compelling the customer to bear his share, or forcing the original stockholder to assume his part.

"To force the stockholders of today to bear a tax amounting to possibly $20 or more per share of $100, which should have been visited on the stockholders of months ago, must impress anyone as inequitable and indefensible.

"Moreover we have no means of protection against this added burden in contracts which are now in force and which we are bound to carry out in the future.

"7. This tax, if imposed upon us, may prevent our taking further business of this character.

"This will mean the inevitable discharge of many employes from the service of the company. The total roll now aggregating approximately 60,000 must then be reduced to the five or six thousand necessary to operate the commercial business of the United States.

"We had expected to continue our maximum industrial activity as long as this war lasted, but the provisions of the pending bill make this an undesirable business risk.

"8. Guncotton, which is the chief ingredient entering into the manufacture of smokeless powder, and a material exceedingly sensitive as an explosive, will come within the classification of 'other explosives.' This tax on guncotton wil prove burdensome to a number of important domestic industries to which it is essential in the products they manufacture.

HAVE ENJOYED PROSPERITY

"We admit that the manufacturers of 'gunpowder and other explosives' have enjoyed a period of exceptional prosperity during the past eighteen months, but that the net results accruing have justified Congress in placing upon them no such burden of taxation as is contemplated by this bill.

"While we have received what might appear as high prices for our products, we have been forced to meet unusual expenses. When this foreign crisis came, it found us with a military explosive capacity of approximately 10,000,000 pounds per annum. To meet the demands made upon us necessitated our multiplying this capacity many times, all preparation being made under pressure and regardless of cost.

"At the threshold of this undertaking, to insure harmony of action and attract labor, we advanced the wage scale to a standard never before known in the explosives industry. At the same time we gave notice of a 20 per cent bonus to all employes, and, in addition, placed every plant under our jurisdiction on the eight-hour basis. The unusual conditions compelled us to go to great expense, inclosing our plants in such a way as to protect them from destruction, illuminating adjoining territory and maintaining a guard system comparable only to a standing army.

PRICES WENT UP

"From the date of the first contract, we were forced to face an ever-ascending scale of prices on raw materials; nor were we ever permitted to forget the fact that when the war was over, the buildings erected and the machinery placed, representing millions of dollars, would stand for little or nothing in the way of value.

"We fear that many of the features noted above have not been taken into consideration before deciding to impose this tax. We have ever responded cheerfully to any taxation levied by our Government, but when such action is taken as threatens the destruction of our business, singling us out as specific objects of penalization, we feel that we are in duty bound to protest.

"In conclusion the manufacture of the particular military explosives which are likely to be taxed out of existence have contributed, probably more than any other industry, toward the revival of trade in this country.

"The du Pont Company alone has absorbed nearly 1,000,000 bales of short fiber cotton formerly of little value and has paid handsome prices therefor, greatly to the advantage of the Southern States. It has paid directly in wages alone in the manufacture of military explosives in the last year and a half about $45,000,000, and has probably been indirectly responsible for the expenditure of a greater amount to the labor on raw materials and machinery which it has puchased.

"It has contributed amazingly to income and corporation taxes, and the enormous expansion that has been made assures our Government a supply of smokeless powder and high explosives in case of war, which previously was never dreamed of. All this has been done without the Government contributing a dollar of expense.

"There can be no 'preparedness' without 'gunpowder and other explosives.' In a broad and liberal scheme of 'preparedness,' can Congress take chances on killing by taxation those industries without which there can be no 'preparedness?'

Very respectfully,
E. I. DU PONT DE NEMOURS & CO.,
P. S. DU PONT, *President.*"

## Current Traffic Development

In case No. 6287 of the Poteau Coal and Mercantile Company *vs.* Abilene & Southern Railway Company, the complainant asks for the reinstatement of joint rates on coal from Witteville, Okla., to points in Texas and other States which had been canceled by the defendants, and for reparation. The defendants voluntarily restored the joint rates, but opposed the claims for reparation. At the hearing certain carriers asked the Commission to determine whether the Fort Smith, Poteau & Western Railway Company, which serves complainant's mine at Witteville, is a common carrier, and, if so, to fix divisions of the reinstated joint rates. Upon all the evidence, the Interstate Commerce Commission held:

1. The rates under attack were unreasonable in the amount that they exceeded the joint through rates formerly in effect and reparation awarded accordingly.

2. The Fort Smith, Poteau & Western Railway Company is a common carrier. The question of divisions left for further consideration.

The complaint in this proceeding was filed October 27, 1913, by a corporation then operating under lease a coal mine at Witteville, Okla.

### Docket No. 7702.

In case No. 7702, the Galloway Coal Company *vs.* the Alabama Great Southern Railroad Company the Commission found that:

1. Relative adjustment of carload rates on bituminous coal from mines in southern Illinois, western Kentucky, and northwestern Alabama to Memphis and other points in southwestern Tennessee not shown to be unduly prejudicial to mines in Northwestern Alabama.

2. Differentials in rates to common markets in favor of certain producing points can be prescribed only when discrimination can be found, and discrimination can be found only where the traffic from those points and from competing points moves all or a part of the way to the common markets over the rails of the same carrier.

MISS ROSE KOROUS.
In Charge of Welfare Work at Utah Plants of the American Smelting and Refining Co.

3. Relative adjustment of carload rates on coal from the same mines to Mississippi and Louisiana east of the Mississippi River found unduly prejudicial to mines in northwestern Alabama, but adjustment approved in Bituminous Coal to Mississippi Valley Territory, 39 I. C. C., 378, found remedial.

4. Long established rate adjustments that accord competing producing districts located at different distances from common markets equal rates will not be disrupted unless substantial justice requires it. The interests of consumers must be considered as well as the interests of producers, and dissatisfied producers deprived of the natural advantage of location must establish actual injury as a result of the discrimination.

5. Divisions of joint rates received by short lines in Mississippi on shipments of coal purchased by them for fuel not shown to be unduly prejudicial to mines in northwestern Alabama.

6. Relative adjustment of carload rates on coal from the same mines to points in southwestern Arkansas, Louisiana west of the Mississippi River, and southeastern Texas not shown to be unduly prejudicial to mines in northwestern Alabama.

# Latest Legal Decisions

### SALE OF OIL WELL FOR TAXES

By the terms of an oil and gas lease the lessee was granted all the oil in and under the land described with the exclusive right to enter thereon for the purpose of drilling and operating for oil and gas, and if a well was not completed within sixty days then the grant should be null and void, unless the lessee should pay the lessor $1 per acre for each six months such completion is delayed. If the first well was a paying well, a second was to be drilled within sixty days from the completion of the first and all additional wells as the first two wells until all are drilled, allowing 15 acres to each well. This lease or contract conveyed an interest in the land, where the lessee had completed producing wells and the wells so drilled with the machinery attached must be considered real estate and not personal property and cannot be sold for taxes as personal property. This proposition is on the theory that while oil and gas leases differ from ordinary leases and usually give the lessee the right only to explore the land for oil and gas and until he finds either one or the other he has no interest in the land, but if the lessee found oil and gas then his so-called lease has ripened into an interest in the land.

Johnson *vs.* Sidney (Indiana Appeals), 109 Northeastern, 934, p. 935, October, 1915.

### UNGUARDED EXCAVATION

A mining corporation is liable for the death of a 12-year-old boy who lost his life by falling into an old excavation on the property of the corporation, and in an action for damages for the death of the boy it is not necessary to prove that the defendant corporation or its officers had actual notice or knowledge of the existence of the excavation nor is it sufficient to avoid liability for the defendant to show that none of its officers had any actual knowledge of the existence of the hole; but the proximity of the excavation to a much traveled path and the knowledge of others in the vicinity of its existence, together with all the circumstances surrounding the situation, were sufficient to have a case submitted to the jury on the question whether the officers of the defendant corporation in the exercise of reasonable diligence ought not to have been aware of the excavation.

Peklenk *vs.* Isle Royale Copper Co. (Michigan), 153 Northwestern, 1068, p. 1069, September, 1915.

### INSPECTION BY LAND OFFICERS

Where a register and receiver of a local land office have been ordered and directed by the Secretary of the Interior to examine and determine whether the land embraced within the boundaries of an unpatented mining claim is mineral or non-mineral, and whether or not a discovery of mineral bearing vein has been made with reference to lode and placer locations, and whether or not any such location has been made in good faith for mineral purposes or for speculative purposes and to be used in connection with trade and business, and where such register and receiver are proceeding to carry out such orders, a court has no jurisdiction to restrain such register and receiver from executing such orders of the Secretary of the Interior.

Cameron *vs.* Weedin, 226 Fed. 44.

### POSSESSORY RIGHTS

The general land office is without jurisdiction to inspect and examine an unpatented mining claim, in the absence of an application for patent to determine whether the land embraced within the boundaries is mineral or nonmineral, or whether a discovery of a mineral bearing vein has been made, and whether or not the location has been made in good faith for mineral purposes.

Cameron *vs.* Woodin, 226 Fed. 44, p. 48.

### NEGLIGENCE OF MINE FOREMAN

The bituminous mining act of Pennsylvania of 1911 places the management of the inner workings of the bituminous coal mines in the hands of a certified mine foreman and neither he nor his assistants whom he appoints are agents of the mining company and the company is not responsible for their acts unless it has notice that an emergency of danger has arisen demanding immediate action and that the mine foreman and his assistants are not discharging their duties with regard thereto; but the mining company is responsible if it has failed to comply with the orders of the mine foreman.

Vagaszki *vs.* Consolidated Coal Co., 225 Fed. 913, p. 915.

### ASSUMPTION OF RISK

Under the bituminous mining act of Pennsylvania there can be no recovery for the death of a miner who was a man of mature age and of extended experience as a miner and had knowledge and appreciation of his danger and who knew that under the mining act he was required to quit work and vacate the place, where his working place was known to be unsafe, and where he knew of the presence of a dangerous rock in the roof that he could not himself remove, and where without assistance he resumed work and apparently undertook to take down the dangerous rock that caused his death, as in such case the conclusion is that he assumed the risk.

Vagaszki *vs.* Consolidated Coal Co., 225 Fed. 913, p. 922.

COLLUSIVE JURISDICTION

Citizens of California will not be permitted to organize a mining corporation in the State of Nevada and transfer to it the legal title to mining property in California for the purpose of conferring an apparent jurisdiction upon a federal court on the ground or diversity of citizenship, which would not otherwise exist.

Phoenix-Buttes Gold Min. Co., *vs.* Winstead, 226 Fed. 855, p. 861.

See Phoenix-Buttes Gold Min. Co. *vs.* Winstead, 226 Fed. 863.

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ACTION FOR WRONGFUL DEATH

Where an action is brought in a United States court to recover damages for the death of a miner under the Pennsylvania State statute, the federal court will take judicial notice of the statutes and judicial opinions of that State and the federal court is bound by the construction given to such act by the courts of Pennsylvania.

Vagaszki *vs.* Consolidated Coal Co., 225 Fed. 913, p. 917.

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APPLICATION OF RULE

Statutes which in terms abolish the doctrine of assumption of risk as a defense go no further than to abolish the defense where the servant is injured by reason of the employer's negligence, and do not abolish assumption of risk where the employer has not been negligent.

Hunter *vs.* Colfax Consolidated Coal Co. (Iowa), 154 Northwestern, 1037, p. 1043, November, 1915.

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It is the duty of a mine operator to use all appliances readily obtained for the prevention of accidents arising from the accumulation of gas or other explosives and a failure on the part of the operator to observe that duty constitutes negligence on his part for which he is liable for an injury resulting proximately from such failure.

Raiha *vs.* Coos Bay Coal & Fuel Co. (Oregon), 151 Pacific, 471; September, 1915.

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### West Virginia Publication

There has just been published one of the most important volumes ever issued by the West Virginia Geological Survey, Morgantown, W. Va. This publication is described as follows:

Detailed report on Wyoming and McDowell Counties, by Ray V. Hennen, issued under date of December 31, 1915, containing 783 pages and introductory matter. It is illustrated with thirty-two halftone plates and twenty-eight figures or zinc etchings in the text. The soil map and report on the area will be issued separately a few months later. This Detailed County Report covers one of the principal areas of the great Pocahontas or "Smokeless" coal fields of West Virginia, giving a complete account of each coal bed, with analyses, estimates of unmined tonnage, and topographic and structural maps showing the elevation, dip and strike of the principal coal beds, including the famous No. 3 Pocahontas, covering the counties of Wyoming and McDowell, the latter leading every other county of West Virginia in the production of coal of the highest grade by several million tons annually. Price, with case of maps, delivery charges paid by the Survey, $2.50; but for combination price with other publications, see general circular of publications. Extra copies of geologic map, $1.00 each, and of the topographic map, 50 cents each.

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## ALASKANS CRITICIZE ACTION AS TO REVISION OF LAWS

No gloves were used by the Alaska Mining and Engineering Society in condemning the action of the House Committee on Mines and Mining in refusing to report out Senator Smoot's bill which had passed the Senate, providing for the Revision of Laws Commission. The Alaskan Society also adopted a resolution criticizing very severely the conduct of James Wickersham, the delegate from Alaska, for the part he took in defeating the Commission.

The Society in its resolutions declares itself to be convinced that the engineers who appeared before the House Committee are honest and sincere, and that the passage of the Smoot bill would result in great good not only for the entire country, but Alaska in particular.

The Democratic committee, of Alaska, in setting forth its intentions, goes on record as follows:

"The United States mining laws have not been changed since their inception, a generation ago, notwithstanding the fact that the mining industry of America has progressed wonderfully until the laws hedging it about have become obsolete. We favor a revision of the mining laws and we pledge our candidate for delegate to cooperate with those working to this end. Practically all the mining men of the country demand this legislation."

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### Says All Should Read It

Karl L. Kithil, just selected to take charge of the new mine experiment station at Tucson, referring to the MINING CONGRESS JOURNAL in a recent letter says:

"Your journal is of great value to the mining interests and industries, and should be read by all men interested therein."

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William Loach, of Boulder, Colo., of the Wolf-Tongue Mining Co., was in Washington recently to attend a meeting of the directors of the company. The Wolf-Tongue is one of the largest tungsten producers in the United States.

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B. Bryan, a petroleum and mining engineer of this city, has opened temporary offices at 120 Broadway, New York City.

## COAL TAXATION SYSTEM IS UNFAIR AND ANTIQUATED, SAYS AUTHORITY

There would seem to be no recognized standard of value for coal content of lands at the present time, among the engineers and county authorities of Lackawanna or Luzerne Counties, Pa., and this lack of a recognized standard results in much confusion, litigation and expense, according to William Griffith, an engineer of standing, of Scranton, Pa. The commissioners of Lackawanna county have variously estimated the value of coal at from $55 to $300 per foot acre, and recently in Luzerne County one group of engineers employed by the landowners estimated the value of a certain tract of land at or around $700 per surface acre, while another group employed by the county authorities estimated the same land at about four times this value; thus indicating to the curious public that the judgment of experts on these questions is about as variable as the weathercock on the barn, being easily influenced one way or the other, according to the interests of the people who employ them. In discussing the matter, Mr. Griffith said:

"Recently a representative of one of our large coal mining companies testified in the Lackawanna County courts that his company considered the coal in the ground worth to them 50 cents per ton. And I presume that at the pending tax appeals other representatives of the same company will aver that the coal is not worth 25 cents a ton.

"All this indicates a sadly mixed state of affairs with reference to coal values, and it would seem that the adoption of some sane method of arriving at the standard of value would be proper at this time. In fact, the tendency, outside of the anthracite region, is in this direction. Not only have authoritative textbooks been written upon this subject, based upon sound principles of finance and engineering, but recently the Department of the Interior of the United States Government, through the Geological Survey, has established rules for fixing the value of the coal lands of the public domain, based upon such standards and principles, from which to estimate the value of each particular property, according to the varying conditions which obtain. The writer has used a similar basis of valuation for many properties that he has been called upon from time to time to value either for the purchaser or seller, or for financial interests to form the basis of value behind bond issues or other obligations, and has universally used the royalty rate as a proper standard of such valuation.

"The supreme courts have declared that a perpetual lease is a sale and that the royalties are installments on the purchase price. Therefore, the royalty represents the value of the coal in the ground, to be paid for as it is mined, and is a fair and equitable standard of value for estimating the worth of the coal; better to our mind than outright sales, because the sales of coal land in this locality are not frequent, and the deeds and records of such transactions usually cover up the actual selling price so that it cannot be ascertained. Of course, the royalties years ago were small—about 15 cents per ton. Later they increased to about 25 cents a ton for prepared coal. Still later about 35 cents was a going royalty, and at the present time it is from 50 cents to 75 cents; but the properties covered by high royalties of this kind are very few, and the tonnage contained is light, representing small comparative values.

"The real question, therefore, would be to definitely determine a proper, fair average royalty applicable throughout the county. Having fixed such for the county, or for any particular coal property in question, the present value of the coal in the land is a matter of nearly the same degree of certainty as we find expressed in the proposition that 2 times 2 are 4. Of course, each property becomes *a problem in itself, but having a basic standard, deductions or allowances may be made to conform to the various conditions and possibilities that may be peculiar to each property.*

"An illustration will perhaps best serve to explain the method of arriving at coal values from the royalty rate as a basis of calculation: If we have on the table before us 100 gold eagles, their value would be $10 each, or $1,000; but if a condition be attached to the possession by which the gold shall be deposited in the vault, and only one gold eagle, or $10 be used each year, then the present value is materially changed, and would be the present worth of $10 per annum, at say 6 per cent interest, for 100 years, which would be $166.17. Thus we note that the element of time affects the present value in a very material way. And the same would be the case in connection with coal. If, for example, we have a coal property which produces a royalty of $10 per year, and we know that the quantity of coal in the land is sufficient to continue this production for 100 years at the same rate, then the present worth of that coal would be $166.17. Again, Lackawanna County contains approximately 600,000,000 tons of coal, and it is being mined at the rate of 18,000,000 tons per year. At this rate it would be exhausted in approximately thirty-three years. If, for example, the average royalty rate for a composite ton (that is to say, a ton composed of the various percentages of different sizes ordinarily produced at the breakers) be assumed at 25 cents, the present value of one such ton per year for thirty-three years (that is, 33 tons), at legal interest, 6 per cent, would be $3.5575, and the present value of 1 ton of coal in the ground, on the above basis would, therefore, be $3.5575 divided by 33 or about 10.8 cents. At the various royalties mentioned below the values would be according to the following tabulation:

| *Average royalty rate for composite ton* | *Present value of 1 ton of coal in ground* |
|---|---|
| 25 cents per ton | 10.8 cents per ton |
| 30 cents per ton | 12.9 cents per ton |
| 35 cents per ton | 15 cents per ton |
| 40 cents per ton | 17 cents per ton |

"If it is desired to express this in foot-acres, we simply multiply the above value per ton by the number of available tons in 1 foot-acre. If, for example, we assume that a fair and reasonable yield for the coal lands of this county is 1,200 tons per foot-acre, then, at the above royalty rates, the present value of the average foot-acre in this county would be as follows:

At 25 cents per ton royalty.....$130
At 30 cents per ton royalty..... 155
At 35 cents per ton royalty..... 180
At 40 cents per ton royalty..... 204

"It would seem to us that a fair and reasonable royalty as between land owner and taxing authorities should be somewhere around 30 cents to 32 cents per ton for the average composite ton, because the major portion of the coal now being operated under royalty is being paid for at approximately this price.

"Then, of course, the question arises as to whether it would be more equitable as between all parties to value the coal at the actual rate which is now being paid for it, or whether it should be valued at a higher rate, in view of the increased royalties now being paid on new leases. These are questions to be determined, but having them once settled for each county, there would then be a standard which would be a basis upon which the value of all properties could be estimated, *these values of course varying according to the economic conditions known to exist on the several properties.*

"It will be noted that this method of ascertaining the taxable value of coal places the greater burden of the tax upon the coal in the going properties, which will be sooner exhausted. For example, at the royalty rate of 30 cents per ton, other things being equal, the coal in a property which will be exhausted in ten years, would have a present value of 22 cents per ton, whereas at the same royalty rate the coal in an adjoining property which had a life of sixty years would have a present value of 8.1 cents per ton. To our mind, this is as it should be, because it is manifestly unfair to tax the unremunerative ton year after year at full rate for sixty or 100 years, whereas the remunerative ton of coal which is mined this year escapes with but the one tax. And, along the same line, virgin properties which are held for future mining, should, to our mind, be considered in the same manner as we now treat unremunerative, unseated lands, by imposing a *sufficient* nominal tax until such time as they become productive. For purposes of conservation, the forestry associations have for years been endeavoring to secure the removal of the tax upon standing timber, until such time as it is cut. They have now realized the fruits of their long efforts through the passage of such a law by the legislature. The same legislation should be enacted to cover the anthracite coal in the ground. It should only be taxed in a nominal way until it is mined. Each ton should be taxed once and once only. Perhaps the better way to accomplish this would be to eliminate the taxation of coal as real estate, except in a nominal way, and lay a tax upon each ton of coal as it is mined, as is being advocated by the Scranton Board of Trade.

"Although these latter suggestions cannot be applied through our present antiquated and unfair laws in the taxation of coal, and are somewhat aside from our subject, they are nevertheless important matters for immediate legislation, which should be vigorously pressed."

## UTAH COPPER COMPANY BREAKS PRODUCTION RECORD

By A. G. Mackenzie

Salt Lake City, July 27.—The Utah Copper Company of Bingham, Utah, has broken its production record several times recently. The company mined and shipped to the mills 44,000 tons of ore July 9, and has plans under way for increasing the plant to handle 50,000 tons a day. A leaching plant with an initial capacity of 2,500 tons a day is included in the plans for enlargement and is expected to be in operation by the end of the present year.

### APPERSON ELECTED GOVERNOR

A. B. Apperson, vice-president of the United States Fuel Company, Salt Lake City, was elected governor of the Utah chapter, American Mining Congress, at a meeting of directors, July 3, to succeed R. C. Gemmell, general manager of the Utah Copper Company. Mr. Gemmell served the chapter as governor very efficiently for a year and resigned on account of the press of business in connection with his company's extensive construction campaign for the coming year.

Geo. H. Dern, of Salt Lake City, a former vice-president of the American Mining Congress, was elected second vice-governor of the Utah chapter to succeed E. L. Carpenter who has moved to New York.

Mr. Apperson, the new governor of the chapter, has had an active career in executive positions with important mining and railroad interests of the West for many years.

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Falcon Joslin, of Seattle and New York, who has been spending some little time in Alaska looking after his interests in the Territory, is now at his home in Seattle.

# Latest Mining Patents

Means for sampling and Checking Miners' Coal. No. 1,191,277. This invention is by Erskine Ramsey, of Birmingham, Ala.

It relates to means for sampling and checking miners' coal or other mineral output so that an accurate record can be kept of the character and quality of the mineral loaded by each miner, which record will serve as a check on the mineral loaded into a given railroad car or like container, and also to indicate to the operator the character of his total output and what parts of his mine are producing an inferior grade of mineral, or showing bad results so that he can change his operations at such points.

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Safety Apparatus for Oil Wells. No. 1,191,229. This invention is by Robert H. Reed, of New Wilson, Okla., assignor of one-half to J. L. Long, of New Wilson, Okla.

It relates to certain novel and useful improvements in an apparatus adapted especially for use in controlling the escape of gas from the tank into which the oil flows from a source of supply such as a well. In this invention it is proposed to provide an apparatus to prevent disastrous explosions and fires, caused by lightning or through other agencies.

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Ore-Classifying Machines. No. 1,191,280. This invention is by Selden Irwin Clawson, of Salt Lake City, Utah.

The invention relates to ore classifying machines, and more particularly to that class of machines in which a series of inclined screens are arranged in a zig-zag manner, over which the ore to be classified travels, the object being to provide a machine which is very strong and durable, and one in which partitions are set at right angles to the axis of the screen so that the ore is caused to travel over the screens a great number of times, thereby increasing the screening capacity.

Another object is to provide a screen and pan with a plurality of alternately arranged partitions for retarding the movement of the material over the screen, whereby the material will be thoroughly classified as it travels over it.

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Expanded Graphite. No. 1,191,383. This invention is by Jonas W. Aylsworth, of East Orange, N. J., assignor to Condensite Company of America, of Bloomfield, N. J.

This invention relates to a novel form of graphite and to a process for making it. This invention changes the physical condition of flake graphite so that after the treatment it is greatly expanded in volume with all of the many small leaves or laminae of which each flake is composed opened up and separated like the leaves of an open or partly opened book without being completely detached from each other.

Rock and Ore Breaker. No. 1,191,564. This invention is by Thomas W. Capen, of Milwaukee, Wis., assignor by Mesne Assignments to Allis-Chalmers Manufacturing Company, a corporation of Delaware.

This invention relates to rock and ore breakers or crushers and has for its object the breaking of rock and ore with greater facility than heretofore and the production of a breaker of great capacity. A further and incidental object is the production of a double breaker in which the two breaking elements of each kind are so opposed as to mutually react to prevent the reaction of the breaking pressure from acting through or across the bearing surface at least in certain directions.

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Rock Drill. No. 1,191,842. This invention is by William August Smith, of Denver, Colo., assignor of one-half to William W. Hassell, of Colorado Springs, Colo.

This invention relates to certain new and useful improvements in rock drills, and the object thereof is to provide an improved and novel construction of rock drill.

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## BIG INCREASE IN COPPER SHIPMENTS FROM ALASKA

Alaska during the fiscal year ending June 30, 1916 shipped to the United States copper, valued at $26,488,000. This compares with shipments valued at $5,182,000 in 1915 and $3,876,000 in 1914. Antimony to the value of $189,000 was shipped during the last fiscal year. Practically no antimony was shipped in previous years. Tin shipments were valued at $79,000. This is not a great increase over the shipments of 1915 and 1914. Lead shipments from Alaska for the same period of 1915 and 1916 are valued at $72,000.

Shipment of gold from Alaska during the fiscal year amounted to $16,200,000. This was an increase of $1,000,000 over 1915 and an increase of more than $4,000,000 over 1914. Silver shipments were valued at $760,000 for the fiscal year ending June 30, 1916. This is an increase of $500,000 over 1915 and $600,000 over 1914.

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### Permissible Explosives Lower Death Rate

In 1914 over 15,000,000 pounds of permissible explosives were used and the fatality rate dropped to .096 per 1,000 men employed. A reduction of 72 per cent. In 1870 there were 13.47 fatal accidents for every million tons of coal mined in this country and in 1914 only 4.78 for every million tons mined.

# Current Federal Legislation

During the present session of Congress 23,896 bills have been introduced. Of this number 17,185 were introduced in the House and 6,711 were introduced in the Senate.

In a caucus held by the majority members in the Senate in July it was decided to adjourn August 19 if possible. An informal agreement was made with the minority members wherein they promised not to filibuster against the bills which had been placed on the Democratic program. Republican members, however, reserved the right to discuss fully any measure which should come up.

It already is very evident that it will be impossible for the Senate to finish its work on the date specified by the Democrats. It certainly will be September 1 before the session adjourns, and there are some of the impression that it will be nearer October 1.

For the past three weeks the House has been marking time. While there are a large number of very important bills before the House Committees, they are not being acted upon owing to the refusal of the House leaders to contribute to the further congestion of the Senate calendar. The Senate already has many times more bills than it possibly can consider. For this reason the House leaders are refusing to allow any further bills to be acted upon in the House, thereby adding to the amount of work before the Senate.

By unanimous consent of all the members of the Committee on Mines and Mining no effort will be made to consider the Foster bill or other form of mining law legislation at this session of Congress.

Letters have poured into the office of Dr. Foster and of other members of the committee in great volume. Such diverging views are shown by these communications as to make it clear to even the more ardent supporters of Dr. Foster's bill that the question of revising the mining code must go over until the short session, at least.

Representative Taylor, of Colorado, who is the leader on the committee in favor of the appointment of a commission to study the needs for changes in the mining law, sees in this difference of opinion a splendid argument in favor of his plans for a general study of conditions by a commission before attempting to formulate a bill.

The sub-committee which listened to the arguments and perused the correspondence against the tax on copper was composed of Senators Stone, of Missouri; Thomas, of Colorado; and Hughes, of New Jersey.

The income tax portion of the bill, which also had a direct bearing on mining companies, was considered by a sub-committee consisting of Senators Williams, of Mississippi; James, of Kentucky; and Gore, of Oklahoma.

The Tariff Commission and dumping features of the bill were considered by a sub-committee consisting of Senators Johnson, of Maine; Smith, of Georgia; and Kern, of Indiana.

The Senate has agreed to take up the oil land leasing bill on the second Monday in December. A hard fight was made by Senators Phelan, of California; and Myers of Montana; to get this bill before the Senate at this session.

Due to the fact that very determined opposition is certain to be encountered in the consideration of this bill the Democratic Senators were unwilling to put it on their program. All efforts are being directed to shorten the session as much as possible. For this reason this bill and a large number of other measures will not be considered further at this session. The Senate calendar is in a very congested state and plenty of work already is banked up for the short session which begins in December.

H. R. 12544. After reporting favorably this bill, which deals with the mining of coal on segregated Indian lands in Oklahoma, it was placed upon the House calendar. Representative Carter, the chairman of the House Committee on Indian Affairs, has been very active in an attempt to get this bill before the House. He has called attention a number of times to the fact that it is not alone a benefit to the operators of mines in that section, but to the Indians and the general public in Oklahoma. Despite his efforts, however, the chances are slight that it will be considered at this session.

A full discussion of the revenue bill, which is now before the Senate, will be found on another page.

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### Added to Permissible List

Explosives placed on the Bureau of Mines permissible list recently are:

Big Red No. 2; Big Red No. 4-L. F.; Little Red No. 2; Little Red No. 3 and Little Red No. 6-L. F.; made by the Equitable Powder Manufacturing Co., East Alton, Ill., and the Egyptian Powder Co., East Alton, Ill.; Miners Friend No. 7 made by the Atlas Powder Co., Wilmington, Del., also was approved.

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J. B. Ross, a prominent tungsten miner of Boulder, Colo., has returned to his home after a visit in the East. Mr. Ross is interested in several companies mining tungsten deposits, and also is the principal shipper of huebernite from Silverton, Colo.

David Atkins, of Atkins-Kroll & Co., of St. Louis, has been in the East on an extended business trip. The Atkins-Kroll Co. is among the largest dealers in rare metals. The company formerly operated sheelite mines and recently has been operating tungsten properties at several points in Nevada. The company also has a large mill at Borus, near Sodaville.

Ralph H. Richards, a petroleum engineer with the Associated Geologists of this city, has returned from an extended trip in the mid-continental field.

King H. Young, of Michigan, has been appointed private secretary to Van H. Manning, director of the Bureau of Mines.

T. W. Woodbridge, of Uplands, Cal., was in the city recently consulting with Van H. Manning, director of the Bureau of Mines.

Van H. Manning, director of the Bureau of Mines, is in the West making preliminary arrangements for the establishment of the new experiment stations.

Franklin K. Lane, Secretary of the Interior, was guest of honor at a lunch given by the chiefs and assistant chiefs of the different bureaus of the Interior Department Bureau of Mines building, July 15. It was in honor of the fifty-second anniversary of Mr. Lane's birthday.

Frederick G. Clapp, of The Associated Geological Engineers, left July 13 for Wyoming. He will visit certain Kansas and Oklahoma fields also before his return to New York.

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## A Straight Face—
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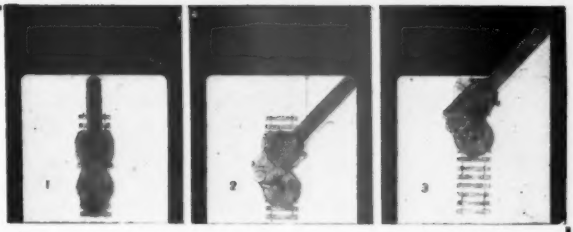
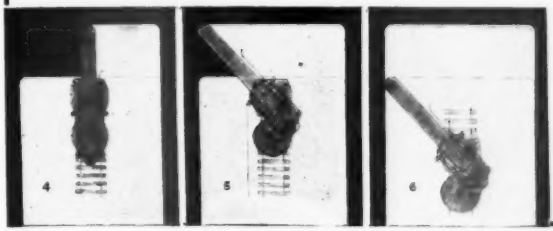
## The GOODMAN
## Straightface Machine



1. Traveling with its cutter arm in mid position the machine arrives at the face in the room.
2. Anchor hole is drilled (by power), anchor set, feed rope attached and cutter arm swung to the right-hand rib.
3. Cutter chain is started, and the cutter arm digs its way into the face as the feed rope is wound in.
4. Straight face cut is made by swinging the arm to the left, in which movement it is caused to withdraw by cam action in such manner as to maintain straight line cutting.
5. Face cut continues to left-hand rib, the cutter arm advancing by cam action to continue straight face.
6. Cut finished by backing the machine along the track using feed rope attached to a jack set behind.



Full details in Bulletin 121-M.

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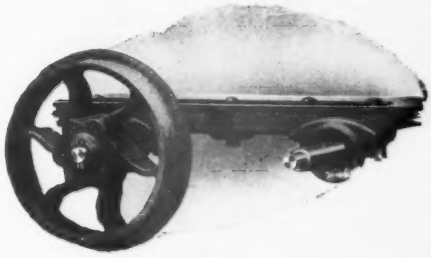
(48)

# Phillips Patent Open Cap Wheel Truck



THE economies that this Truck will effect are real and tangible. The wheels will not wear out internally and are guaranteed in this respect; they seldom break, due to our process of annealing and the high quality of materials used; are thoroughly chilled, and when lubricated with fluid grease will run for six months to a year with one lubrication. This Truck is used at hundreds of Mines, two concerns each using over 10,000, while literally dozens of other companies have found it profitable to discard their old running gear in order to equip their cars with it exclusively. It will pay you to investigate this Truck.

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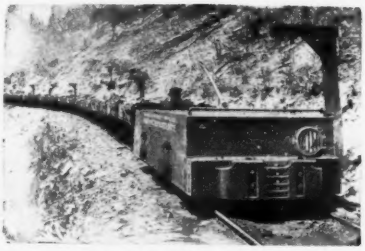
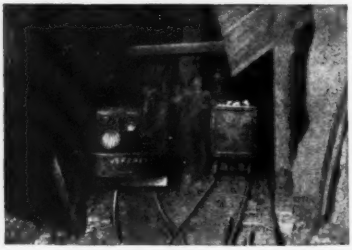
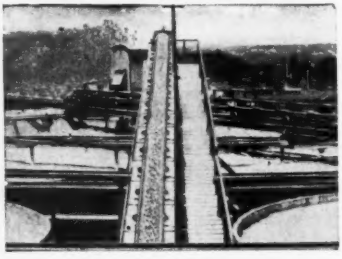


"Armorplate" Type Locomotive for Main Haulage.

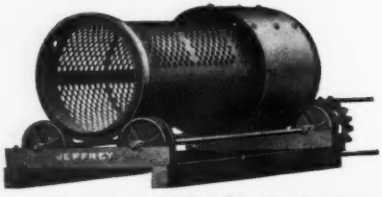


Storage Battery Locomotive for Narrow-Gauge Haulage in Metal Mines.



Belt Conveyer Handling Rock Refuse at a Gold Mine.

Stepped Multi-Bladed Mine Fan. Saves 20 to 30 Per Cent in Power Consumption.

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**Department 58 has Special Literature on these subjects, which they will gladly send upon request.**

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